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John Martin, R.A.

JOHN MARTIN was a member of a remarkable family. William, the eldest, was an eccentric character, who called himself the "Philosophical Conqueror of All Nations," and whose career has already been sketched in the *Monthly Chronicle* (vol. i., page 343). Jonathan, the second brother, made himself conspicuous by attempting to burn down York Minster (see *Monthly Chronicle*, vol. i., page 418). John, the youngest of the brothers, was born in a house called East Land Ends, Haydon Bridge, near Hexham, on the 19th of July, 1789. His parents removed to Newcastle while he was yet a boy. There his father taught the sword and single-stick exercise, at the Chancellor's Head Inn, in Newgate Street. As John grew to the age when it was necessary to settle his career in life, his taste and inclinations were so decidedly towards art that his father, adopting a somewhat practical application of it, determined to make the lad a herald painter. We shall let him tell his own story as he told it to the editor of the *Illustrated London News*, in a letter dated Lindsey House, Chelsea, March 14, 1849:—

Upon the removal of my family to Newcastle, I was, when 14, apprenticed to Wilson, the coachbuilder, of that town. I worked with him for a year, in no small degree disgusted at the drudgery which, as junior apprentice, I had to endure, and at not being allowed to practise the higher mysteries of the art; when, just previously to the expiration of the year (from which period I was to have received an increase of pay) one of the senior apprentices told me that my employer would evade the payment of the first quarter, on the grounds that "I went on trial," and that "it was not in the indentures." As it had been foretold, so it turned out. Upon claiming the increase, I was referred to my articles, and the original sum was tendered. This I indignantly rejected, saying, "What! you're soon beginning, then, and mean to serve me the same as you did such an one? But I won't submit." And, turning on my heel, I hastened home. My father highly approved of my conduct—declared that I should not go back—and immediately furnished me with proper

drawing materials, the most satisfactory reward I could receive. I worked away to my heart's content for some days; when, at length, while so employed, the town-sergeant came to take me off to the Guildhall to answer charges brought against me by my master. I was dreadfully frightened, the more so as none of my family was within call to accompany me, and, on entering the court, my heart sank at sight of the aldermen, and my master, with lowering face, and his witnesses. I was charged on oath with insolence



John Martin.

—having run away—rebellious conduct—and threatening to do a private injury. In reply, I simply stated the facts as they occurred. The witnesses produced against me proved the correctness of my statement in every particular; and the consequence was a decision in my favour. Turning, then, to my master, I said, "You have stated your dissatisfaction with me, and apprehension of my doing you a private injury; under these circumstances you can have no objection

to returning my indentures." Mr. Wilson was not prepared for this, but the alderman immediately said, "Yes, Mr. Wilson, you must give the boy his indentures." They were accordingly handed over to me; and I was so overjoyed that, without waiting longer, I bowed and thanked the court, and running off to the coach factory, flourished the indentures over my head, crying, "I've got my indentures, and your master has taken a false oath; and I don't know whether he is not in the pillory by this!" My family were delighted with the spirit I had displayed, and at my emancipation from an occupation they saw was uncongenial, and my father at once took measures to place me under an Italian master of great merit, and some reputation in Newcastle, named Boniface Musso, the father of the celebrated enamel painter, Charles Musso. I remained under his instructions about a year, when Mr. C. Musso, who was settled in London, wished his father to come and reside with him, and M. Musso urged upon my parents the advantage of my accompanying him. After much cogitation, many misgivings on my mother's part, and solemn charges to our friend, it was ultimately agreed that I should join him in London within a few months. I accordingly arrived in London at the beginning of September, 1806.

After residing some time with Musso, Martin became dissatisfied with his accommodation in the family, and removed to Adam Street West, Cumberland Place. Having, as he tells us, resolved never more to receive pecuniary assistance from his parents, who had already done enough in providing means for establishing him in London, he worked hard during the day to support himself, while at night he diligently studied architecture and perspective, by the knowledge of which he was afterwards to achieve so much of the reputation he enjoyed. Musso had introduced Martin to Collins, a glass manufacturer, who resided at 106, in the Strand, and much of Martin's employment at this time consisted in painting on glass and china.

At the age of nineteen, as the painter has himself recorded, he got married, and, his employment at Collins's being irregular, he says he had to use every available means for his support—teaching, painting small oil pictures, glass and enamel painting, water-colour painting, &c.

In 1811 we find him for the first time an exhibitor at the Royal Academy. The work thus exhibited, which had been rejected the year before for want of room, is described as landscape, a composition. Speaking of the year 1812, Martin says:—"Having now lost my employment at Collins's, it became indeed necessary to work hard, and, as I was ambitious of fame, I determined on painting a large picture, 'Sadak,' which was executed in a month. You may easily guess my feelings when I overheard the men who were placing it in the frame disputing as to which was the top of the picture? The work, however, though hung in the ante-room of the Royal Academy, received, to my inexpressible delight, a notice in the newspapers, and was eventually sold, under interesting circumstances, to the late Mr. Manning, Director of the Bank of England, for 50 guineas."

The next year he produced "Paradise: Adam's First

Sight of Eve." It was exhibited the same year, and sold for seventy guineas. Martin tells us he sent it for the inspection of Mr. West, who received him with great urbanity, and introduced him to Leslie, saying the two young painters should be acquainted, as he prophesied they would reflect honour on their respective countries. The "Paradise" was exhibited in the great room of the Royal Academy; but when in the following year (1814) "Clytie," and in 1815 "Joshua Commanding the Sun to Stand Still" (the last a great success in point of popularity), were hung in the ante-room, he considered himself insulted by the place allotted to them. The "Joshua" was afterwards exhibited at the British Institution, and obtained one of the prizes of a hundred guineas, but continued unsold for many years. With regard to it, Martin says:—"I had been so successful with my sepia drawings, that the Bishop of Salisbury, the tutor to the Princess Charlotte, advised me not to risk my reputation by attempting the large picture of 'Joshua.' As is generally the case in such matters, these well-meant recommendations had no effect; but, at all events, the confidence I had in my powers was justified, for the success of my 'Joshua' opened a new era to me."

Certain it is that Martin early began to entertain a high opinion of his own abilities, leading him to think that he was entitled to rank in the Royal Academy as R.A. Seeing that this was not to be accorded to him, he withdrew his name from the Academy books as a candidate, forfeiting thereby all chance of academic rank, the only kind of professional distinction which falls to the lot of the English artist. He continued, however, to exhibit at the Academy, but sent his more important works to the British Institution. A conversation with Allston, in which Martin wholly differed from that painter, led him to paint "Belshazzar's Feast," an elaborate work, which occupied him a year. Leslie, he says, spent a morning in attempting to convince him that his treatment was wrong; but he persevered, and in 1821 completed his picture, and exhibited it in the British Institution. On this occasion he was rewarded with a prize of two hundred guineas. The work was considered a new mode of treating such subjects, and created a sensation among the general public.

Martin had, in 1817, been appointed "Historical Landscape Painter to the Princess Charlotte and Prince Leopold," but artists objected to such pictures as his being classed as historical. In historical paintings, they said, the principal source of interest must ever lie in the action and expression of human beings with whom the painter peoples his canvas; but Martin's pictures were a cross between architecture and landscape, in which the human figures told only by their quantity, the architecture serving rather to contribute to perspective immensity than being necessary to the ex-

pression of the subject. It was sneeringly, perhaps enviously, said that the painter's works could be reckoned "sublime" only by the same sort of people who thought Montgomery's "Satan" and Pollock's "Course of Time" equal to "Paradise Lost." These opinions, however, were not held by many all. Some of the best artists thought highly of the genius of Martin. Wilkie, for instance, writing to Sir G. Beaumont in 1821, says:—"Martin's picture is a phenomenon. All that he has been attempting in his former pictures is here brought to maturity, and, although weak in all those points in which he can be compared with other artists, he is eminently strong in what no other artist has attempted. 'Belshazzar's Feast' is the subject; his great element seems to be the geometrical properties of space—magnitude and number, in the use of which he may be said to be boundless. The contrivance and disposition of the architecture is full of imagination."

The painter made use in this picture of all the properties at his command—the hanging gardens, the tower of Babel, range upon range of massive columns, and terraces one above the other. The light shed on the impious feast is derived by the painter from the letters of fire, the handwriting on the wall, which the prophet is explaining to the terrified king. The artist, who was still connected with glass-painting, repeated the subject on a sheet of plate-glass. This was shown in the Strand, inserted in a wall, so that the light was really transmitted through the terrible handwriting; the effect was startling, yet, judged by any recognised canon, it was surely allied more to the diorama than to the fine arts.

Though Martin quarrelled with the Academy about the hanging of the "Clytie" and the "Joshua," and sent his "Belshazzar" to the British Institution, he did not wholly secede from the former. Between 1819 and 1821, he exhibited six works there—in the latter year his "Revenge," from Collins's "Ode to the Passions." He further exhibited, in 1823 and 1824, the "Seventh Plague" and "The Paphian Bower." Martin soon found, however, that even the British Institution did not use him so well as he thought he deserved. He says in his evidence before a committee of the House of Commons in 1836, that there was some connection between the directors of the Institution and the Academy that made them give the Academicians the best places, so that he rarely hazarded sending a large work to Pall Mall. He then became an exhibitor at the Society of British Artists; but but for a time only, for after 1836 we find him again at the Royal Academy, pretty constantly exhibiting there works of minor interest. In all, between 1836 and 1852, he exhibited sixty-seven pictures, an average of more than four per annum.

After the production of "Belshazzar's Feast," which many thought his best picture, Martin continued to paint poetical and Scriptural subjects, such as "Adam and Eve Entertaining the Angel Raphael,"

"The Creation," "The Eve of the Deluge," "The Deluge," "The Fall of Nineveh," "The Fall of Babylon," "The Destruction of Herculaneum," "Pandemonium," &c. Many of these works were engraved, and as that art was peculiarly suited to display his pictures, the impressions had a large sale both at home and abroad, and greatly spread his reputation. Some of the plates he engraved himself, spending no little time in trying various processes; and he complained before a committee of the House of Commons of the injury that he, in common with other artists, sustained by the insufficient protection against piracy afforded to such works. His popularity led to his being engaged to illustrate the poems of Milton. For these illustrations he received £2,000.

Martin had an eye to other subjects besides art. He says in his autobiography already quoted:—

I have scarcely room to account for the last twenty years of my life; suffice it that some portion was devoted to engraving, which I was eventually obliged to abandon, owing to the imperfect laws of copyright, my property being so constantly and variously infringed that it became ruinous to contend with those who robbed me; and I was, therefore, driven from the market by inferior copies of my own works, to the manifest injury of my credit and pecuniary resources, while I may without vanity affirm that even art itself suffers by the non-circulation of the engravings, for, of course, neither my own plates nor the pirated copies will sell without the impulse of novelty. In consequence of the strong interest I had always felt in the improvement of the condition of the people and the sanitary state of the country, I turned my attention to engineering subjects; and two-thirds of my time, and a very large portion of my pecuniary means, have, since 1827, been devoted to the objects I had at heart, though even here I have been obstructed and injured by the same objection of the inefficiency of the patent laws, and, indeed, total absence of real protection for original designs in engineering and mechanics. My attention was first occupied in endeavouring to procure an improved supply of pure water to London, diverting the sewage from the river, and rendering it available as manure; and in 1827 and 1828 I published plans for the purpose. In 1829 I published further plans for accomplishing the same objects by different means, namely, a weir across the Thames, and for draining the marshy lands, &c. In 1832, 1834, 1836, 1838, 1842, 1843, 1845, and 1847, I published and republished additional particulars—being so bent upon my object that I was determined never to abandon it; and though I have reaped no other advantage, I have, at least, the satisfaction of knowing that the agitation thus kept up, constantly, solely by myself, has resulted in a vast alteration in the quantity and quality of water supplied by the companies, and in the establishment of a Board of Health, which will, in all probability, eventually carry out most of the objects I have been so long urging. Among the other proposals which I have advanced is my railway connecting the river and docks with all the railways that diverge from London, and apparently approved by the Railway Termini Commissioners, as the line they intimate coincides with that submitted by me, and published in their report—the principle of rail adopted by the Great Western line—the lighthouse for the sands appropriated by Mr. Walker in his Maplin Sand lighthouse—the flat anchor and wire cable—mode of ventilating coal mines—floating harbour and pier—iron ship, and various other inventions of comparatively minor importance, but all conducting to the great ends of improving the health of the country, increasing the produce of the land, and furnishing employment for the people in remunerative work.

In view of his water supply scheme, Mr. Martin visited all the sources in the country round about London within a circle of twenty or thirty miles. Besides his labours towards giving London a supply of pure water, for which, if unsuccessful on the definite plan he advocated, he deserved the gratitude of the citizens, since the attention on all hands called to the subject led to the eventual adoption of remedial methods, the Thames Embankment scheme was just a modification of John Martin's idea.

Martin was yet labouring assiduously at his art, with large pictures in various stages of progress on his easel, when, on the 12th of November, 1853, during a visit to the Isle of Man, he was struck with paralysis, which rendered him speechless and deprived him of the use of his right hand. From the first there was no prospect of his recovery. He seemed, however, to have entertained an idea that abstinence was a remedy for his complaint, and to have resisted taking sufficient food, so that he sank rapidly, and died on the 17th of February, 1854, at Douglas, aged 65.

The three immense pictures on which he was engaged almost up to his death—"The Last Judgment," "The Great Day of Wrath," and "The Plains of Heaven"—have been diligently exhibited in every important town in the kingdom, and engraved on a large scale. Many of our readers must have seen the originals, and most of them the engravings. It is not on them that Martin's admirers will base his reputation. His best works are undoubtedly his earlier ones. In them he has shown originality, imagination, and earnestness, and that material sublimity which results from the littleness and feebleness of man being brought into immediate comparison with the magnitude and might of nature.

The title of K.L. means Knight of the Order of Leopold—an honour conferred on Martin spontaneously by the King of the Belgians, his old patron, Prince Leopold. He also received compliments, presents, and honours from the Emperor of Russia, the King of Prussia, and the reigning families of France. Besides enjoying these distinctions, he was a member of the Academies of Antwerp and Brussels, and an honorary member of the Royal Scottish Academy.

Our portrait of John Martin is copied from a crayon drawing by his son Charles, a photograph of which has been kindly lent us by another of his sons, Leopold Charles Martin. The original portrait was drawn three weeks before the great artist died.

The Martin Family.

John Martin was one of five children (four boys and one girl). William and Jonathan are well known. Richard, the third son, entered the army when young, passed through the Peninsular War, became quarter-master of his regiment, married, and had one daughter, who became

wife to George Bullen, a chief librarian and keeper of the printed books in the British Museum, an appointment he still holds. My father's sister married a Mr. Atkinson, and had one daughter, who married Henry Warren, K.L., president of the Royal Institute of Painters in Water Colours. John Martin, my father, had a family of eight children. Two died young. The first, Isabella, was for long his secretary, but subsequently became joint manager with Joseph Bonomi of Sir John Soane's Museum. She died in 1879. Alfred was chief superintendent of Income Tax in Ireland : *ob.* 1872. Jessie married Joseph Bonomi. Charles was known as an artist in New York. Zenobia married a son of Allan Cunningham, the poet—Peter Cunningham, chief clerk of the Audit Office, Somerset House, well known as author of "London, Past and Present," and other important works published by John Murray. Leopold Charles, your humble servant, named after Prince Leopold, first King of the Belgians, his godfather, was for over 36 years in the public service, and is author of "Illustrations of British Costume from William I. to George III.," "Gold and Silver Coins of All Nations," "The Literature of the Civil Service," "Guide to Cardiff," "Handbook to Swansea," contributions to the *Society of Arts Journal*, &c. He married a sister of John Tenniel, the distinguished contributor to *Punch*.

LEOPOLD CHARLES MARTIN, London.

Epitaph on an Engineer.

 SWALD GARDNER, the driver of a locomotive engine, lost his life near Stocksfield Station, on the North-Eastern Railway, on August 15, 1840. The following epitaph is inscribed on his tombstone in Whickham Churchyard :—

My engine now is cold and still,
No water does my boiler fill ;
My coke affords its flame no more ;
My days of usefulness are o'er ;
My wheels deny their wonted speed,
No more my guiding hand they heed ;
My whistle, too, has lost its tone,
Its shrill and thrilling sounds are gone ;
My valves are now thrown open wide,
My flanges all refuse to guide ;
My clacks, also, though once so strong,
Refuse their aid in the busy throng ;
No more I feel each urging breath,
My steam is all condensed in death.
Life's railway's o'er, each station's past,
In death I'm stopped, and rest at last.
Farewell, dear friends, and cease to weep,
In Christ I'm safe—in Him I sleep.

It is said that the lines were written by Thomas Codling of Wylam, left at Blaydon Station, and afterwards printed as a memento of Gardner. But the same epitaph is used to commemorate one Thomas Scaife, who was killed at Bromsgrove Station, near Birmingham, on November 10, 1840.

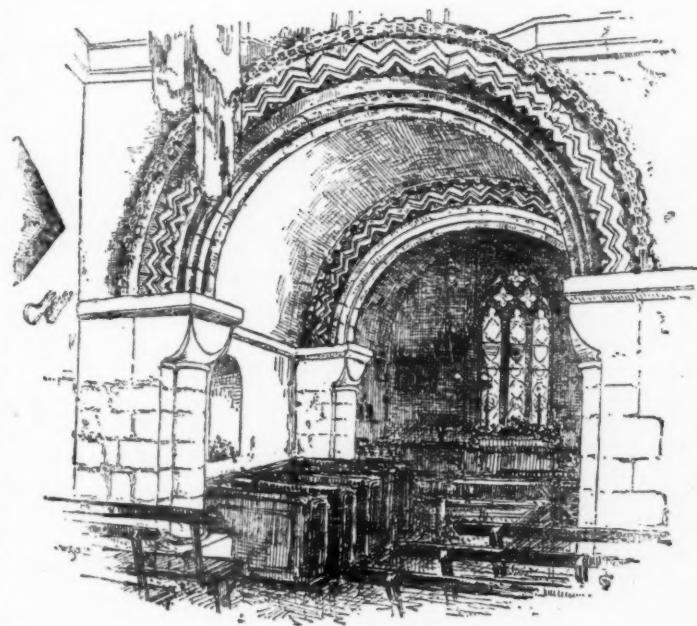
The Delavals of Delaval Hall.

MIDWAY between Tynemouth and Blyth stands the now ruined but still beautiful seat of the Delavals. The race is extinct in the male line, and the grand estates which once called them lords have passed, through marriage, to the Norfolk Astleys. Still the memory of the daring and splendour of the Delavals lingers around the spot, investing the stately palace by the sea with all the interest of legend and romance.

The family first figures in history when its representative married a relative of William the Norman. This Delaval distinguished himself in the subjugation and settlement of the Saxon land, and it was but following the good old rule of spoil for the strong when twenty knights' fees were assigned to him as his share in the conquered country. The energy of Norman rule showed no signs of slackness in his hand. Casting about for a site on which to erect his feudal fort, he found he had scarcity of choice. There was no rising ground on that far-reaching plain except Earsdon and Seaton. It would never do for a Border lord to build his home in a lowly situation, as if he either feared or neglected his prowling foes. He was of the mind of the royal eagle, and must have his eerie where he could scour the country round, and whence at will he could swoop down upon his prey. Seaton was conveniently near the shore, and though it lacked the boldness of Earsdon, it gave command of the landscape from the Priory of Tynemouth to the foot of the Cheviots. Here, then, he built his castle, while around it were clustered the cottages of serfs and retainers. Of this original structure not a vestige remains, except the Chapel of Our Lady, which, by the help of many renovations, has survived every trace of the secular stronghold, and still serves its sacred purpose. The magnificent hall which now crowns the highest point in the park was erected more than a hundred and sixty years ago by Admiral Delaval, from the designs of the famous builder of Blenheim and many other seats of the English nobility, Sir John Vanburgh. Seaton Delaval

will advantageously compare with the best works of the same master, and is undoubtedly one of the most striking stone structures in the North of England.

The Delavals were related to the Norman Conqueror by the marriage of Guido or Guy de la Val to Dionysia, William's niece. Sir Hendrick de la Val, Guy's second son, carried one of the principal banners when the Duke of Normandy invaded England. The family got large possessions in Northumberland and also in Yorkshire, and Gilbert Delaval was one of the twenty-four barons sworn to see the Magna Charta and the Charta de Foresta confirmed by the Pope. Robert Delaval represented Northumberland in the Parliament of Charles II., and was created a baronet. Sir Ralph Delaval, who belonged to a younger branch of the family, was a distinguished naval officer, who fought gallantly at La Hogue, rose to be Vice-Admiral of the Red, and was buried in Westminster Abbey. Sir Ralph, the second baronet, formed the harbour of Seaton Sluice, at a great expense, and was even appointed collector and surveyor of his own port, as a sort of reward for his labour. Admiral George, a cadet of the family, who built Seaton Delaval Hall, distinguished himself both in



CHAPEL OF OUR LADY, SEATON DELAVAL.

arms and in the Cabinet, and was sent, in 1710, by Queen Anne, as Ambassador or Plenipotentiary to the King of Portugal and the Emperor of Morocco. He was killed by a fall from an unruly

horse, as he was riding out after dinner near his own house, in the month of June, 1723. His elder brother, Edward, had issue, by Mary, daughter of Sir Francis Blake, of Ford Castle, one son, viz., Francis Blake Delaval, Esq., who died in 1753, having married Rhoda Alfreesee, a Huntingdonshire lady, by whom he had eight sons and five daughters, the former of whom all died without any legitimate male issue. Sir Francis Blake Delaval, the eldest son, is said to have been the gayest and most accomplished Lothario of the age. Having dissipated his fortune, he entered into an arrangement with his brother, Sir John Delaval, who allowed him £4,000 a year till his death in 1771. He had endeared himself so much to the inhabitants of Newcastle by his zeal for public liberty, after the violation of the Middlesex election, that when his remains were brought down from London in grand funeral solemnity, and laid in state at a Mr. Nelson's, they crowded in such numbers to see the body, surrounded with banners, escutcheons, &c., that many people were much injured in the crush. Sir Francis's brother, John Hussey Delaval, was created a baronet in 1761, and raised to the peerage, as Baron Delaval, in 1783. Lord Delaval died without male issue in 1808, aged 80 years, and his entailed estates devolved on his brother, Edward Hussey Delaval, of Doddington; but his other estates and personal property were bequeathed to his relict, with remainder to his lordship's granddaughter, the Marchioness of Waterford, of Ford Castle, where Lady Delaval died in 1822. Edward Hussey Delaval, who was an excellent classical scholar, a good linguist, and an adept in several sciences, died without issue in 1818, and was buried in Westminster Abbey. At his decease, the valuable estate of Seaton Delaval descended to Sir Jacob Astley, of Melton Constable, Norfolk, in right of his grandmother Rhoda, the first and last Lord Delaval's eldest sister, who was espoused to Sir Edward Astley, grandfather of Sir Jacob. Sir Jacob was summoned to the House of Lords, in 1841, as Baron Hastings, being one of the heirs of Sir John de Hastings, summoned to Parliament by the above title in the 18th Edward I., (1290). The present Lord Hastings, George Manners Astley, who was born in 1857, succeeded to the title in 1875.

It was especially during the time of Sir Francis Blake Delaval and his brother, the first and last lord, that the family acquired their almost world-wide reputation for courtly splendour, profuse living, and open-house jollity. Sir Francis was on intimate terms with all the exquisites of the day, a friend of John Wilkes's, and an acquaintance of Foote the actor's. Cook, in his *Memoirs of Foote*, gives the following character of the baronet:—

This gentleman was born with very superior advantages of person and fortune. The former he availed himself of in the prosecution of his pleasures; the latter he employed alternately as a means of dissipation and of

generosity. In modern honour and modern gallantry he vied with the first fashionables in Europe. He had not a grain of Nero's cruelty, but, had he been born in his court, would have rode with him as a charioteer, fiddled with him as a musician, fenced with him as a gladiator, and spouted with him as a player. Though indolent in his business, he was active in his pleasures; and so strongly did he possess the spirit of emulation, that he would be the leading showman of his day, whatever species of frivolity was the fashion. Yet, with all these drawbacks on his character, he was not deficient in either wit or learning, or in the ready application of both. He excelled sometimes in repartee, and once replied to the late Lord Chatham, in the House of Commons, with a point and promptitude which for a time abashed even that celebrated statesman.

One of Sir Francis's freaks was to carry on, in conjunction with Foote, the mystery of a fortune-teller, which they did with prodigious reputation and success, assuming the requisite disguises. Carrying out this fascinating whim during a whole season, they are supposed to have broken off, or brought on, more matches in fashionable life than all the dowagers in town could accomplish or frustrate. Sir Francis's great object, it is said, was to secure his own union with Lady Paulet, and upon the accomplishment of that feat the magician suddenly disappeared. Miss Edgeworth's somewhat pompous and pragmatical father, Richard Lovell Edgeworth, gives the following account of this fortune-telling experiment in his *memoirs*:—

Some years before I was acquainted with him, Sir Francis, with Foote for his coadjutor, had astonished the town as a conjuror, and obtained from numbers vast belief in his necromantic powers. This confidence he gained chiefly by relating to those who consulted him the past events of their lives; thence he easily persuaded them that he could foretell what would happen to them in future; and this persuasion frequently led to the accomplishment of his prophecies. Foote chose for his scene of new necromancy a large and dark room in an obscure court, I believe in Leicester Fields. The entrance to this room was through a very long, narrow, winding passage, lighted up by a few dim lamps. The conjuror was seated upon a kind of ottoman in the middle of the room, with a huge drum before him, which contained his familiar spirit. He was dressed in the Eastern fashion, with an enormous turban and a long white beard. His assistant held a white wand in his hand, and with a small stick struck the drum from time to time, from which there issued a deep and melancholy sound. His dragoon answered the questions that were asked of him by his visitants, while the conjuror preserved the most dignified silence, only making signs, which his interpreter translated into words. When a question was asked, the visitant was kept at a distance from the drum, from which the oracle seemed to proceed. The former habits and extensive acquaintance of Sir Francis Delaval and his associates, who, in fact, were all the men of gallantry of his day, furnished him with innumerable anecdotes of secret intrigues, which were some of them known only to themselves and their paramours. Foote had acquired a considerable knowledge of the gallantries of the City; and the curiosity which had been awakened and gratified at the west end of the town by the disclosure of certain ridiculous adventures in the City, gave to the conjuror his first celebrity. It was said that he had revealed secrets that had been buried for years in obscurity. Ladies, as well as gentlemen, among the fools of quality, were soon found to imitate the dames of the City in idle and pernicious curiosity, and under the sanction of fashion the delusion spread rapidly through all ranks. Various attempts were made to deceive the conjuror under false names, and by the substitution of persons; but, in general, he

succeeded in detecting these; and his fame stood at one time so high as to induce persons of the first consideration to consult him secretly. His method of obtaining sudden influence over the incredulous was by telling them some small detached circumstance which had happened to them a short time before, and which they thought could scarcely be known to anybody but themselves. This he effected by means of an agent, whom he employed at the door as a porter. This man was acquainted with all the intriguing footmen in London; and while he detained the servants of his master's visitants as they entered, he obtained from them various information which was communicated by his fellow-servants, through a pipe, to the drum of the conjuror.

Lady Paulet's vast fortune became wholly Sir Francis's by his marriage with that foolish old lady. He contrived, it was said, to dissipate the greater part of it during the short time they lived together; and a remnant of it was secured for the lady's own use only by the divorce which took place before it was wholly gone. Foote was very generally accused, as we learn from Doran's "Annals of the Stage," of having earned an annuity from Sir Francis by bringing about this unhappy match with the wealthy widow, who had been a very intimate friend of the player's.

On the night of the 7th March, 1751, Drury Lane Theatre presented a strange appearance. It had been hired by some noble amateurs, who acted the tragedy of "Othello." Here is the cast of the principal characters:—

Othello.....	Sir Francis Delaval
Iago.....	John, subsequently Lord, Delaval
Cassio.....	Edward Delaval
Roderigo.....	Captain Stephens
Desdemona.....	Mrs. Quon (sister of Sir Francis, and later the wife of Lord Mexborough)
Emelia.....	Mrs. Stephens

Macklin superintended the rehearsals, and Horace Walpole was present, for he says of the amateurs, in his characteristic way:—

They really acted so well that it is astonishing they should not have had sense enough not to act at all. The chief were a family of Delavals, the oldest of which was married by one Foote, a player, to Lady Nassau Paulet, who had kept the latter. The rage was so great to see this performance, that the House of Commons adjourned at three o'clock on purpose. The footman's gallery was strung with blue ribands. What a wise people! What an august Senate!

The Prince of Wales and other members of the royal family occupied the stage box on this occasion; and the presence of blue ribands, in place of livery tags, in the footman's gallery, was owing to the circumstance that enough tickets were issued to completely fill the house, but without indicating to what part of it the bearers would be admitted. The first who arrived took the best places; and tardy peers, knights of the garter, their wives and ladies, were content to occupy the gallery for once, rather than have no places at all. Ten guineas were offered and refused for a ticket. Such an audience was never seen in Drury Lane before, and has never been seen there

since. Foote was intended for one of the party; but, either from accident or design, he did not attend till the play was finished; and then he entered the great green-room as the company were all taking refreshments. "O Foote! where have you been? What have you lost? Such a play you'll never have another opportunity of seeing!" was the general buzz from one end of the room to the other. To this the wit bowed contrition, disappointment, and so forth; after which, slyly approaching the place where Garrick sat, he asked him in a whisper, loud enough to be heard by the whole company, what he *seriously* thought of it. "Think of it!" said Garrick, equally wishing to be heard, "why, that I never *suffered* so much in my whole life!" "What, for the author? I thought so," retorted Foote. "Alas, poor Shakespeare!"

Some time afterwards, another scheme for a play was set up, and in this acted no less a personage than his Royal Highness Edward Augustus, afterwards created Duke of York and Albany, who was in love with Lady Stanhope, one of Sir Francis's sisters. The play was the "Fair Penitent," and the actors and actresses were Sir Francis, as Horatio; Mr. (afterwards Lord) Delaval, as Sciolto; Sir J. Wrottesley, as Altamont; Prince Edward, as Lothair; Lady Stanhope, as Calista; and Lady Mexborough, as Lavinia. After the play, which was performed in a theatre in Westminster, the party adjourned to the King's Arms, Covent Garden. Here the company, says Edgeworth, were still in fact performing amusing parts, though they were off the stage; and amongst them in great glory was Macklin, who, throwing off his wig, called for a night cap, which was his sign that he meant to be very interesting. Edgeworth and Sir Francis carried on, by concerted signs, one of their juggling schemes, by which they defeated Macklin, who had declared that no man alive could make the slightest difference apparent to an audience between the three words in italics in this sentence—"Pare me a pair of pears."

The versatile baronet next appeared upon a different stage, having entered as a volunteer on board the fleet under Commodore Howe, destined to make a descent in the bay of Cherbourg, on the French coast, in the year 1758. Prince Edward volunteered on the same occasion, in order to learn the rudiments of the sea-service. After a tedious passage from Calais with contrary winds, a landing was effected without opposition, Cherbourg was occupied, the harbour and basin and all the forts in the neighbourhood were destroyed, and a contribution of three thousand pounds was levied on the inhabitants, who had no other alternative but to pay it. Another descent was then made at St. Cas, on the coast of Brittany, a few miles west of St. Malo, and here a sanguinary engagement took place, in which the British were routed and driven on board their ships, with the loss of a thousand chosen men killed and

wounded and taken prisoners, but not before they had performed prodigies of valour against overwhelming odds. In this battle, which was not a great one only because the numbers engaged in it were but small, Sir Francis displayed the most romantic bravery; but he came out of it unhurt, although he had been in the thickest of the fight. The shore was covered with dead bodies. When our hero returned home, which was in 1761, he was created a Knight of the Bath.

Having determined to go into Parliament, he went down to Andover, which then sent two members to the House. A perfect stranger to the place, he obtained his election by a singular manoeuvre. On the nomination day, he discharged from a culverin five hundred guineas over the heads of the multitude assembled round the hustings, which soon determined the choice of the free and independent voters. After this, he became a patriot, and a member of the Society of the Bill of Rights, along with John Wilkes and others. This seems to have raised doubts in the minds of the Andoverians as to his eligibility to sit as their representative any longer. At any rate, Mr. Edgeworth tells us that an opposition was got up (we believe at the general election in 1768), and the members of the Corporation, which was understood to sway the constituency, were so closely divided between the "Liberty Men" and the "No Blasphemers," that it was a nicely drawn battle between Sir Francis and his competitor. One sturdy fellow held out against all applications. He declared that he would vote for neither of the contending candidates. Sir Francis paid him a visit, and with much address endeavoured to discover some means of softening him. He knew that the man was unavailable by plain bribery; he therefore tried to tempt his



DELAVAL HALL, NORTHUMBERLAND.

ambition, his love of pleasure, his curiosity, in short every passion that he thought could actuate this obstinate common councilman. He found that all the public spectacles of London were familiar to the man, who had often gone to town on purpose to see them. This seemed, indeed, to have been his favourite relaxation. Sir Francis at last discovered that he had never seen a fire-eater, and that he did not believe the wonderful stories he had heard of fire-eaters; nor could it, he said, be imagined that any man could vomit smoke, flame, and fire out of his mouth like a volcano. Sir Francis proposed to carry him immediately to town, and to show him the most accomplished eater of fire that had ever appeared. But as the wary burgess of Andover could by no means be prevailed on to go up to town, Sir Francis instantly despatched a trusty servant to London, to request Angelo, then in the height of his fame, to come to his assistance. Among his various accomplishments, Angelo possessed the art of fire-eating in the utmost perfection. A few hours after he received the request, he thundered into Andover in a chaise and four, express, to eat fire for Sir Francis Delaval's friend. When the obdurate voter saw this gentleman come down, and with such expedition, on purpose to entertain him, he began to yield. But when Angelo filled his mouth with torrents of flame that burst from his lips and nostrils, and seemed to issue even from his eyes—when these flames changed to various colours, and seemed continually to increase in violence and intensity—our voter was quite melted. He implored Angelo to run no further hazard. He confessed that he "did not think the devil himself could cast out such torrents of fire and flame, and that he believed Sir Francis had his Satanic Majesty for his friend, otherwise he never could have prevailed upon him to break the vow which he had made not to vote for him."

For this time Sir Francis succeeded in his election, but on the next occasion he found his interest still lower than before in Andover. When he commenced his canvass, he went to the house of the Mayor, who had hitherto been his friend, and with whom he usually lodged. The Mayor's lady had also been on his side formerly, but Sir Francis now perceived by her averted

glances that he had lost her favour. As he paid her some compliments while she made tea, the lady scornfully replied that "his compliments to her were no more genuine than his tea canisters." Now, it seems that on the former occasion a promise had been made to her of a handsome tea chest, with silver canisters, in place of which she had received only plated canisters. Sir Francis was struck dumb by this discovery. When he recovered himself, he protested in the most energetic manner that a trick had been put upon him as well as upon her by the person whom he had employed to buy the tea chest. He offered to produce his order to his agent; he pleaded his own character as a gentleman, and his known habits, not only of generosity, but of profusion. All would not do; the enraged Mayoress treated his apologies with disdain, and his professions as counterfeit coin. What was to be done?



SEATON SLUICE

With the Mayor's vote he lost other votes. The Corporation openly declared that unless some person of wealth, and consequence, and honour appeared from London, and proposed himself as a candidate, they would elect a gentleman in the neighbourhood who had never canvassed the borough. Next morning an express arrived early in Andover, with an eloquent and truly polite letter from Sir Robert Ladbroke, Knight, alderman of Bridgewater Without, and Father of the City of London, declaring his intention to stand candidate for the free and independent borough of Andover, intimating that his gouty state of health required care, and begging the Mayor, with whom he had some acquaintance, to secure for him a well-aired lodging.

Mrs. Mayores, in high exultation, had a bed prepared for the infirm Sir Robert in her best bed-chamber; supper was ready at an early hour; but no Sir Robert appeared. At length a courier arrived with a letter excusing his presence that night, but promising that Sir Robert would breakfast next morning with the Mayor. In the meantime, the neighbouring gentleman who had been thought of as a rival candidate to Sir Francis, not finding himself applied to, and seeing no likelihood of success, had prudently left home to avoid being laughed at. The morning came, the breakfast passed, and the hour of election approached. An express was sent to hurry Sir Robert. The express was detained on the road. And when the writ was to be read, and the books opened, the old member, Sir Francis Delaval, appeared unopposed on the hustings; his few friends did not even need to go to the poll; and in default of the expected millionaire from the City, who, for the best of reasons, never made his appearance, Sir Francis Blake Delaval was duly elected.

But with this unscrupulous trick the honourable baronet's electioneering success at Andover ended. His attorney's bill for these elections was enormous, and was brought before the King's Bench. One item stood thus:—"To being thrown out of the window of the George Inn, Andover—to my leg being thereby broken—to surgeon's bill, and loss of time and business,—all in the service of Sir Francis Delaval, £500." It appeared, when this curious item came to be explained, that the attorney had been attempting to imitate the jokes of his patron, but in a very clumsy fashion. He had sent cards of invitation, in the name of the Mayor and Corporation, to the officers of a regiment in the town, to dine and drink his Majesty's health on his birthday, and similar cards from the officers to the Mayor and Corporation. The two parties met, dined, and enjoyed themselves. When each began to thank the other for the hospitable entertainment, the trick came out; and the unlucky attorney, who had the folly to be present, was hoisted through the window by the enraged company!

The result of the extraordinary freaks we have detailed was that Sir Francis Blake Delaval quite dissipated his fortune, which, upon the death of his father, was about £9,000 a year; and he was obliged, as already stated, to enter into an arrangement with his brother, Sir John, afterwards Lord Delaval, who allowed him £4,000 a year. But his end was near. One morning he was found dead in bed. The *Annual Register* for 1771 thus records the fact:—

Aug. 7.—Yesterday, the Hon. Sir Francis Blake Delaval, K.B., in the 48th year of his age. He dined the day before with his brother, Mr. Thomas, at Clapham, whence returning in perfect health he went to Dover Street to pay a visit to his sister, the Countess of Mexborough, was observed to be as well as ever, only towards bedtime complained of a small giddiness in his head, which he expected soon to go off. In this

persuasion he composed himself to rest, but, after a few groans, expired as represented.

Nineteen years after Sir Francis's demise, the play of the "Fair Penitent" was enacted at Seaton Delaval, in an elegant theatre which had been fitted up in the house. This was on the 29th December, 1790. An after-piece, entitled, "You May Like or Let it Alone," had been composed for the occasion. This piece consisted of a number of songs, selected from other pieces, and introduced in an original plot. The performers were Lord Delaval, Lord Tyrconnel, his brother-in-law, Mr. Spearman, Mr. Williams, Mr. Francis Foster, Lady Tyrconnel, Mrs. Abbs, Miss Daniel, Miss A. Daniel, Miss Ferry, and Master Taylor. An epilogue, written and spoken by the lord of the mansion, is said by Sykes to have contained much humour and good point. The tragedy was "performed in a manner that would have done credit to a regular theatre," at least so it is set down in the "Local Records."

Strange tales used to be told by the old people of the neighbourhood of the mode of life of the Delavals in these extravagant days. All the members of the family, male and female, were models of grace and beauty, the men perfect Adonis, the women worthy to contest the palm with the Cyprian goddess herself. They lived for luxurious enjoyment, love, and gallantry, the gayest of the gay, the wildest of the wild. Lord Delaval entertained an almost perpetual crowd of company at Delaval Hall. The frequent fêtes and masquerades that were given converted the house and gardens into a perfect fairyland, with throngs of gay and lively creatures frolicking and flirting about, as in the fabled isle of Calypso. The most extraordinary pranks used also to be played, to the amusement of all but the actual sufferers. The house was fitted up with strange contrivances for performing practical jokes. Beds were suspended, for instance, by pulleys over trap-doors, so that when the guests had retired after a carouse, and were just dropping asleep, they were rapidly let down into a cold bath! Another contrivance was that of partitions between sleeping rooms, which could be suddenly hoisted up into the ceiling, so that when ladies and gentlemen were retiring to rest, and had doffed all their finery, and were in various stages of undress, they were astonished to see the walls of the rooms disappear in a moment, as if by enchantment, the guests finding themselves (as William Howitt remarks) in a miscellaneous assembly of both sexes in the oddest and most embarrassing plight imaginable.

One of the scandalous tales yet current is that Lady Tyrconnel, Lord Delaval's sixth daughter, *néé* Sarah Hussey Delaval, "a lovely woman to look at," with hair of such luxuriance that when she rode it floated on the saddle, used to strip to her nether garment, like Nanny and her sisterhood in "Tam o' Shanter," and dance with the officers from Tynemouth Barracks. Her

husband, George Carpenter, second Earl of Tyrconnel, took her as his second wife (3rd July, 1780), and had issue by her two sons and one daughter, Lady Susan Hussey Carpenter, who, marrying Henry, second Marquis of Waterford, in 1805, became the mother of the third marquis, of royster-doyer memory, who inherited from the Delavals not only Ford Castle, on the Northumbrian river Till, but no doubt also his strong penchant for practical jokes. The Earl of Tyrconnel was a dissipated man, and kept several mistresses; but her ladyship, on the other hand, to be upsides with him, was said to have stooped to be the mistress of Prince Frederick, Duke of York and Bishop of Osnaburg, the brother of George IV. Still, if we may believe the statement of one old woman who was conversant with all her mad goings, Lady Tyrconnel was only "a foolish hoyden." There is a portrait of her ladyship at Ford Castle; and an arch and most lovely creature, says William Howitt, she must have been. Lady Tyrconnel, the last survivor, we believe, of Lord Delaval's lovely daughters, died at Seaton Delaval on the 7th of October, 1800, after an illness of many months. She had left her husband, or been separated from him, for some time; but it is not true that she was ever divorced. It was the earl's first wife, Lady Frances, daughter of the Marquis of Granby, from whom his lordship procured a divorce, by Act of Parliament, in 1777. Lady Tyrconnel's two sons, George and John, succeeded to the earldom one after the other, and, both dying without issue, the title became extinct. The elder of the brothers was an officer in the Russian service, and lost his life from excessive fatigue, at Wilna, in Lithuania, where a monument was erected to his memory by the Russian commander, Prince Kutusoff Smolenski.

Delaval Hall was partly destroyed by fire in January, 1822. Folks in the neighbourhood did not hesitate to ascribe the disaster to Sir Jacob Astley himself, who, as we have seen, inherited the estate in right of his grandmother, Rhoda, the first and last Lord Delaval's sister. The story went that he did not want to live in it, and therefore caused the building to be burnt in order not to be taxed for it.

The harbour of Seaton Sluice, constructed at great expense by Sir Ralph Delaval in the reign of Charles II., was greatly improved by Lord Delaval, who cut a passage through the solid rock 900 feet long, 54 feet deep, and 30 feet wide. But the place has long since fallen into decay. It is generally thought that Sir Walter Scott borrowed his description of the little port of Ellangowan, in "Guy Mannering," from the real port of Seaton, more especially as to the hardness of the rock out of which the canal or sluice was cut. Sir Walter also alludes to the Hall in "Marmion," in the lines—

I marked amidst the trees the Hall
Of lofty Seaton Delaval,

although the Hall had not at the supposed date of "Marmion" replaced the ancient castle.

Our view of Delaval Hall is taken from a photograph, while the sketches of Seaton Sluice and of the Chapel of Our Lady have been kindly lent to us by the Society of Antiquaries.

The Dicky Bird Society.

By Uncle Toby.



HE history of the Dicky Bird Society is the history of a wonderful success. It is the history of a movement which was certainly initiated by Uncle Toby, but which has from the very first been carried on almost solely and wholly by the boys and girls who have gathered themselves around him. It is, in fact, the history of a genuine and as wholesome a society as was ever suggested or brought into existence. It is this history, then, that Uncle Toby is about to relate.

THE BEGINNING.

The 7th of October, 1876, ought to be, and, indeed, will be, a memorable date in the annals of humane teaching in the North of England. It was on this date that the *Newcastle Weekly Chronicle* opened its columns to Uncle Toby—the very same Uncle Toby who has ever since, week by week, tried to instil into the minds of the young people who have read his contributions the duty of kindness to all living things. The first number of the Children's Corner explained a good many things—who Uncle Toby was, how he proposed to do his work, what help he expected from the little folks, how he had made the acquaintance of Father Chirpie, what a cowardly thing cruelty is, how much misery is inflicted on the feathered tribe by the robbing of nests, and how delightful it would be if children would pledge themselves to treat birds and animals with tenderness and affection. All these and a good many other things besides were explained in the first column Uncle Toby wrote for the *Weekly Chronicle*.

WHO IS UNCLE TOBY?

As a matter of course, Uncle Toby introduced himself to the children by explaining who he was. Years and years before he had ever thought of making for himself a household name among the boys and girls in all parts of the world, he had read a book called "Tristram Shandy." This book was written, as thousands of the children whom he has addressed have since learnt, by a celebrated author of the name of Laurence Sterne. An important character in "Tristram Shandy" is "My Uncle Toby." One story therein related of "My Uncle Toby" is so touching, so full

of tenderness, and so delightful and impressive in all that it implies, that the memory of it has never faded, and is never likely to fade, from his recollection. It was a story that showed more clearly than anything he had ever read before, or has ever read since, how tenderly and lovingly it is possible to treat even the creatures which sometimes torment and annoy us. "My Uncle Toby" is represented to have been sitting at dinner one hot summer's day when a big blue-bottle fly came buzzing around him. The fly made him so uncomfortable, caused him so much annoyance, and vexed him to such a degree, that he, "after infinite attempts," caught it at last as it flew by him. Did he crush it in his anger? No, he was too humane for that. It occurred to him that it was not the fly

and more famous among the young. Thus it came to pass, too, that Uncle Toby is represented, in the picture which has for so long a time stood at the head of the Children's Corner, in the garb and habit of the last century—the garb and habit of Tristram Shandy's dear old relative. The original Uncle Toby wore a cocked hat, knee breeches, and a wide-skirted coat; moreover, he was accustomed to smoke a long pipe. And so it is that the Uncle Toby of our own day is pictured in the dress of the period when Laurence Sterne wrote his history of Tristram Shandy, wearing his cocked hat, smoking his long pipe, and listening to the lively prattle of the children who hang about his knees.

THE NAME OF THE SOCIETY.

Uncle Toby intimated in the first number of the Children's Corner that he had a plan to propose to all his little friends. It came about, he said, in this way:—A wise old bird, once upon a time, used to come and explain all his troubles to him. This wise old bird was none other than Father Chirpie. "There were two things," Father Chirpie said, "that made his life very unhappy. First of all, in the snowy winter time, he could not get enough to eat; then, in the spring time, when he and his little wife had built a small house for their small bird babies, some cruel boys would sometimes come and steal it away." Father Chirpie's complaints so affected his friend that he made up his mind, as sure as his name was Uncle Toby, that he would some day form a society of little people who would help to feed the birds in winter time, and also promise not to take their nests in the spring. Uncle Toby added that he would in the following week tell everybody what the name of this society should be, how it should be managed, and what should be the rules and regulations for keeping it in order. Meantime, he asked the children to write to him, to tell him what they thought of his plan, and to draw on the left hand corner of their envelopes the picture of a bird. There was no need for Uncle Toby to invent a name for the society; the children themselves invented it for him. It was they who gave it the name it has ever since borne, and ever will bear—that of the Dicky Bird Society. And it was they who soon after abbreviated it into the well-known D.B.S.

AN AMUSING EPISODE.

One of the funniest letters printed in the Children's Corner in the early days of the Dicky Bird Society was from a Newcastle lad, who was so earnest in protecting the birds that he and his brother actually thrashed another lad whom they saw cruelly torturing a sparrow. Here is the letter:—

Newcastle, December 19, 1876.

Dear Uncle Toby,—My brother and myself have made up our minds to protect all the little birds. We started on Saturday, when the punching my brother Charley gave Tommy Smith, who lives in our street, was awful. The cruel boy had a sparrow tied by the leg to a



that was at fault, but the place it occupied in relation to himself. What, then, did "My Uncle Toby" do? Instead of killing his tormentor, he carried it to the window, lifted the sash, and drove the fly from the room, saying, as it passed out into the sunshine: "Go, poor fly; get thee gone! Why should I hurt thee? This world surely is wide enough to hold both thee and me." It was My Uncle Toby's action, so considerate and so inspiring, so completely in harmony with the everlasting doctrine of kindness, that led the editor of the Children's Corner, when he commenced his weekly contributions on the 7th of October, 1876, to adopt the name which has year by year ever since become more

bit of string, which was hung over a lamp-post, and was dangling the poor bird before his dog and frightening it nearly to death. I chased the dog with my mother's clothes prop, while my brother settled Tommy Smith, and has promised to give him more unless he joins your Dicky Bird Society.—Yours truly,

WILLIAM JOSEPH TAIT.

Uncle Toby, very naturally and properly, while commanding the good intentions of his young friend, delivered a homily on the new system of propagandism, adding advice which all the readers of the *Corner* were asked to take to heart. The homily was so effective that the enthusiastic young gentleman who had blacked his neighbour's eyes in the cause of mercy wrote to say that he intended to follow Uncle Toby's counsel. Perhaps more interesting even than this statement were others to the effect that Tommy and William Joseph had become "first-class friends"; that Tommy was now "dead nuts on anybody who tortures our dicky birds"; and that both were resolved to keep "a sharp look-out on the lads in our street." A week or two later Tommy Smith, having become a member of the society, wrote a long letter to the *Corner* himself—a letter in which he declaimed with great indignation against the pigeon shooting he had seen on the Town Moor. This curious and interesting episode, however, did not end here; for the lads who had come into conflict about the ill-treatment of a bird undertook a mission of kindness on their own account. "Tommy Smith," his friend wrote on the 10th of March, 1877, "is going on the war-path as soon as his toothache is better. He has heard tell of a boy at Benwell who traps sparrows, and, after plaiting their heads, ties a piece of flannel round their necks and sets them off." The enterprise, however, to which Tommy Smith devoted himself, as soon as he had recovered from the toothache, ended in a sad catastrophe. William Joseph, writing on the 31st of March, thus described what had happened to him:—

Poor Tommy Smith has finished his crusade; but as he has not succeeded he is afraid to let you know about it, so I will do so for him. Tommy, after coming out of school, hurried home and gobbled up his tea, and then marched off to New Benwell. He there soon found the lads he was seeking, and pulling out a piece of paper and a pencil asked them all to sign it; but they would not, and pelted poor Tommy with clay. But Tommy would not give in, and followed them to a pond and saw them all upon rafts. Tommy sat down upon the edge of the pond, and was thinking how to get them to sign the paper, when one of the boys had got slyly off the raft and went behind poor Tommy and shoved him in. Poor Tommy was all over yellow clay, and you would not have known him from the *Yellow Dwarf* in the pantomime. After that, Tommy thought it best to come away, but is determined to go again. His toothache is worse; the ducking he got at Benwell did him a lot of harm.

Notwithstanding the unfortunate result of Tommy's missionary efforts at New Benwell, no two members did more in the early days of the movement to make the Dicky Bird Society popular in the West End of Newcastle than Tommy Smith and William Joseph Tait.

EARLY MEMBERS OF THE D.B.S.

As we have just seen, Uncle Toby, in the very first column he ever wrote for the *Weekly Chronicle*, declared his intention to form a society of little people, all of whom would pledge themselves to feed and protect the birds, besides behaving with kindness to all living things. The following week he announced that he had opened a Big Book, in which he intended to keep the names of all the members of the new society. Very soon the names of young people began to reach him in great and increasing numbers. With Father Chirpie's help, these names were duly entered in the Big Book. The first list of entries in the Big Book was published on the 21st of October, 1876; the second a fortnight later. Then the lists were published regularly, and new lists have been printed every week since. After the lapse of so many years, it may interest old and new members alike to read the earlier names inscribed in the Big Book. Here, then, are the first twenty-five:—

1. Kate Dodd, Newcastle.
2. Edward C. Scott, Barnsley.
3. William Alexander Birkbeck, Middlesbrough.
4. Ernest W. Adams, Newcastle.
5. Isabella McLea, South Shields.
6. Maggie McLea, South Shields.
7. Minnie Scott, Barnsley.
8. Lucy Ironsides, Lanesley.
9. Albert Ernest Hillary, Tow Law.
10. Eveleen Mary Soppet, Newcastle.
11. Alice Hanning, Newcastle.
12. Fred Hanning, Newcastle.
13. Tom Hanning, Newcastle.
14. James Moore, Newcastle.
15. George Joy Cogan, Hartlepool.
16. Elizabeth Ann Robson, Toronto, Durham.
17. Cora Eveleen West, Ferryhill.
18. Lillian Richardson, Newcastle.
19. Amy Richardson, Newcastle.
20. J. T. Fenwick, Newcastle.
21. Esther Louisa Mornington, Stokesley.
22. Edith E. Palphramond, Bishop Auckland.
23. W. H. Henzell, Heaton.
24. David Ainsley, Chester-le-Street.
25. Mary Birkbeck, Middlesbrough.

Then came the names of thirty-nine school children at St. Ives, Cornwall, which Miss Jane Dinning, the kindly teacher of the school in that town, had collected for Uncle Toby. After these thirty-nine names from Cornwall came the following, which made up the first hundred members who joined the D.B.S.:—

65. Marion Henzell, Heaton.
66. Leila Henzell, Heaton.
67. Elizabeth J. Nicholson, Gateshead.
68. H. G. Nicholson, Gateshead.
69. Fred. Nicholson, Gateshead.
70. Leila Allhusen, Newcastle.
71. Frank Allhusen, Newcastle.
72. F. W. Whitworth, Sunderland.
73. Meggy Patterson, Ryton.
74. Mary Patterson, Ryton.
75. David Mackie, Newcastle.
76. T. Henry Fawcett, Glasgow.
77. A. E. Fawcett, Glasgow.
78. Rosa E. Fawcett, Glasgow.
79. William B. Towers, Newcastle.
80. Isaac S. Towers, Newcastle.

81. Emma Towers, Newcastle.
82. Susan Tindale, Hartlepool.
83. Martin B. Tindale, Hartlepool.
84. Patty Larbottom, Bradford.
85. E. Lee Simpson, Newcastle.
86. Edward Mackie, Newcastle.
87. J. Smith, Newcastle.
88. Ada Eveline Adams, Newcastle.
89. Agnes A. King, North Shields.
90. R. M. Sims, Newcastle.
91. R. H. Watson, Barrington Colliery.
92. Kate Darkin, West Hartlepool.
93. Ada Mary Brough, Newcastle.
94. James Maitland, Newcastle.
95. Harry Harnett, Houghton-le-Spring.
96. Sidney Allen.
97. Ada E. Haworththwaite, Newcastle.
98. John Best, Newcastle.
99. Mary Ann Muse, Spalding.
100. Willie Stafford, Newcastle.

THE GROWTH OF THE SOCIETY.

The hopes of Uncle Toby, when he first began the Dicky Bird Society, were of a moderate character indeed. Neither he nor anybody else connected with the movement could foresee the magnificent dimensions to which it would extend. "We have now," he wrote on January 20, 1877, "nearly four hundred members; that is, there are four hundred little hearts and eight hundred little hands determined to be kind to the birds." And then he went on to speculate as to the number of birds these four hundred members could feed. "But, though we are getting on so well," he continued, "we must not grow tired of doing well. Uncle Toby has set his whole heart and whole mind on having 5,000 members in the society. And when we grow up to this, and, supposing each member only feeds with crumbs ten birds, we shall have 50,000 pensioners." These modest expectations of the founder of the Dicky Bird Society were not long in being realised. A thousand members had been enrolled on March 10, 1877; five thousand on May 19, 1877; ten thousand on July 14, 1877; twenty thousand on February 7, 1878; thirty thousand on March 1, 1879; forty thousand on February 7, 1880; fifty thousand on April 2, 1881; sixty thousand on May 27, 1882; seventy thousand on August 18, 1883; eighty thousand on July 12, 1884; ninety thousand on October 10, 1885; and one hundred thousand on July 24, 1886. Since that time the numbers have increased at a still more rapid rate, so that now (December, 1887) there have been enrolled considerably more than 130,000 members of the D.B.S.

A GREAT DEMONSTRATION.

When one hundred thousand members had been enrolled, Uncle Toby considered that it would be appropriate to hold a great gathering and entertainment in celebration of the event. The day fixed was the 26th of July, 1886. Major Blenkinsopp Coulson kindly undertook to marshal the procession. Assembling in the Town Hall, the children marched in order to the Tyne Theatre. Unfortunately the rain poured down all day, so that this part of the demonstration was shorn of much of its effect. The Mayor of Newcastle (Sir B. C. Browne) took the chair in the theatre, while

the Vicar of Newcastle (the Rev. Canon Lloyd), the Sheriff of Newcastle (Mr. Thomas Bell), Mr. W. D. Stephens, and other gentlemen took part in the proceedings. The late Mr. R. W. Younge had organised a series of special performances, which were received with great delight. Songs composed for the occasion were sung at intervals by the children themselves. Such was the success of the gathering that not only was the theatre crowded to its utmost capacity (admission being by ticket, issued to members beforehand), but large numbers were unable to find accommodation. Hence it was there and then resolved to repeat the entertainment three days later. Again was the theatre crowded from floor to ceiling. The number present at the two entertainments amounted to about 8,000. And the arrangements were so excellent that this vast assembly of little folks, coming from all parts of the North of England, was gathered and dispersed without a single accident of any kind.

EXTENT OF THE SOCIETY.

Although the Dicky Bird Society was initiated in the North of England, it very soon extended to all parts of the civilized world. The name of Uncle Toby, as the founder and president of a great organization of children intended to promote the principles of kindness and humanity, is almost as well known in Cumberland, Lancashire, Cheshire, and Yorkshire, as it is in Northumberland and Durham. Nor is that name much less familiar in the British colonies. Even in foreign countries, and among children who do not speak our language, it is not by any means unknown. It is, in fact, a name that has become a synonym for tenderness. The first branch of the Dicky Bird Society established outside of the British Isles was commenced in Norway on the 3rd of February, 1877. A few weeks afterwards, a branch was established in Victoria, Australia. Then the cause was taken up in Nova Scotia, in New Zealand, in Tasmania, in South Africa, and in other of our distant colonies. Besides all these widespread localities, as the pages of the Big Book show, the D.B.S. can boast of members in France, Germany, Italy, Sweden, Gibraltar, Constantinople, Hong Kong, Ceylon, South America, various parts of the Indian Empire, and almost all parts of Canada and the United States. Indeed, it may be said that there is scarcely a district in any quarter of the globe in which English people have settled that does not contain members of the Dicky Bird Society.

THE PLEDGE OF THE SOCIETY.

When the Dicky Bird Society was first commenced, Uncle Toby drew up two pledges—one for girls, and another for boys. While the girls promised to be kind to all little birds, to feed them with crumbs, and to teach all their friends to be kind to birds too, the boys promised, in addition, never to take a nest or kill or hurt the young ones. Both boys and girls pledged themselves further to try and get all their

companions to join the society. Slight alterations were subsequently made in both the pledge of the society and the general rule relating to the members, until at last all were required to make and sign the following declaration :—

I hereby promise to be kind to all living things, to protect them to the utmost of my power, to feed the birds in the winter time, and never to take or destroy a nest. I also promise to get as many boys and girls as possible to join the Dicky Bird Society.

With the view of making the organization as simple as possible, so that the youngest child might be able to understand what to do and how to do it, Uncle Toby framed a general rule, which rule reads now, and has done for some years past, as follows :—

Every boy or girl is admitted a member on taking the above pledge. Each new member must sign his or her name on the list sent to Uncle Toby. The lists must be accompanied by a letter attesting the genuineness of the signatures signed by officers or other members of the society, by the teachers of the school which the proposed members attend, or by the parents or relatives of the boys and girls who wish to join our society. In case the new member cannot write, his or her mark must be witnessed in the same way as the signature. The names, when thus guaranteed, will be entered in the Big Book, and printed in the *Newcastle Weekly Chronicle*. All letters which should be addressed to "Uncle Toby, *Weekly Chronicle*, Newcastle-on-Tyne," must be written on one side of the paper only. Every envelope should bear outside it, at the top left hand corner, a drawing or picture of a bird.

CHILDREN'S DRAWINGS.

Complying with the last injunction in the general rule of the society, the children have every week sent Uncle Toby elaborately ornamented envelopes, &c., one specimen which is here reproduced.

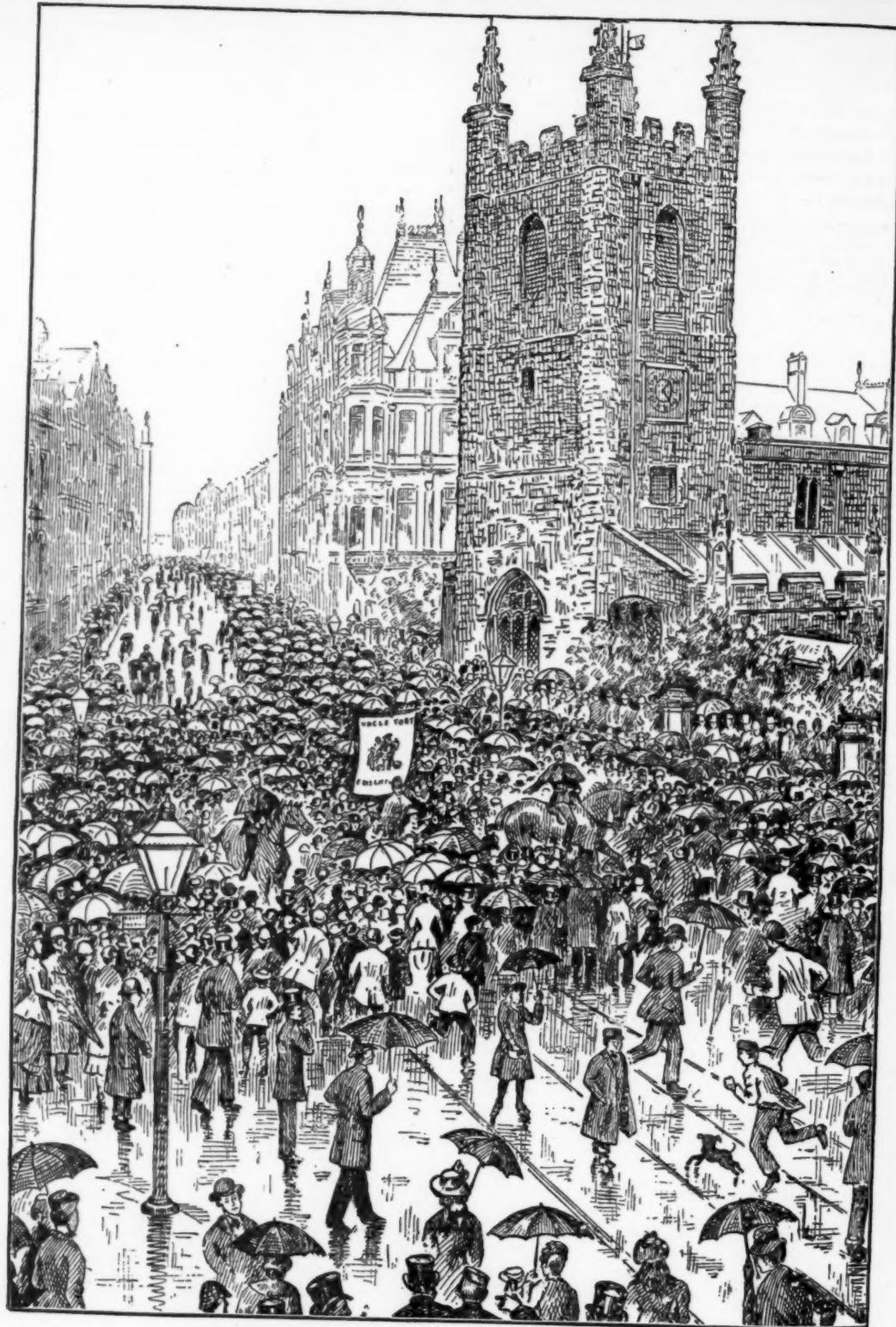
THE BADGE OF THE SOCIETY.

The D.B.S. had not been long in existence before the little folks began to inquire what they should wear in order to distinguish themselves. To meet what appeared to be the general wish of the members, Uncle Toby explained a few weeks after he had commenced operations that the badge of the society would be a yellow ribbon or rosette, worn by boys and girls alike. This badge has never been altered. Members of the Dicky Bird Society who wish to show that they are pledged to feed and protect the birds, and to be kind, besides, to all living things, wear in their button holes or attached to their dresses bits of yellow ribbon or rosettes made of the same colour and material.

CAPTAINS AND COMPANIONS.

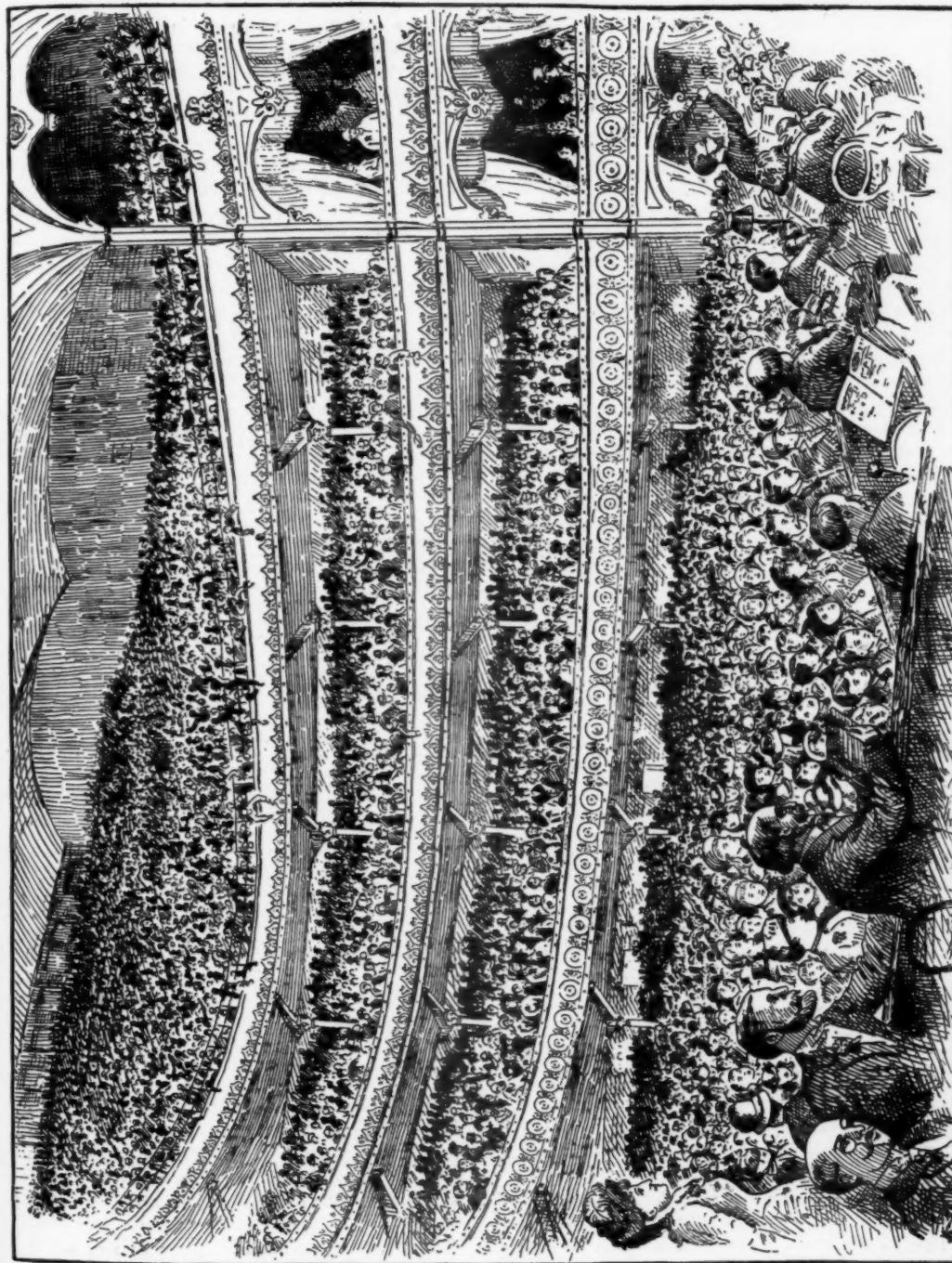
It occurred to Uncle Toby, before the movement was many months old, that it would be desirable to distinguish in some appropriate manner those members of the Dicky Bird Society who had exerted themselves to promote its interests. A system of appointments was therefore devised which would advance the welfare of the society, and at the same time please the little folks themselves. Uncle Toby announced in the spring of 1877 that he proposed to confer on active and diligent members the rank and title of captain or companion—boys to be captains and girls companions—of the Dicky Bird Society. These dignities were intended to be both a reward for past services and an incitement to future exertions. The children who received them were expected to watch over the interests of the society in their respective districts, to see that the members kept faithfully to their





UNCLE TOBY'S PROCESSION, 1886, PASSING ST. JOHN'S CHURCH.

From Photo by P. M. Laws.



UNCLE TOBY'S ENTERTAINMENT, 1886, TYNE THEATRE, NEWCASTLE.

pledges, to recruit the ranks of the society, and generally to become among the boys and girls of the neighbourhood veritable missionaries of kindness. The institution thus devised has realised all the advantages that were expected from it. Uncle Toby knows for a fact that children in certain districts where our officers are most active hesitate to commit cruelties to which they would otherwise be prone, lest our captains and companions should get to learn about them. The appointments to the high and important dignities mentioned have never been made without careful consideration: and after the children have been duly nominated by their friends and acquaintances in our ranks, Uncle Toby has taken special care to ascertain that the nominated members are worthy of the distinctions proposed. When he has satisfied himself on this subject, the appointments are formally announced in the Children's Corner. It goes without saying that the honour of holding office in the Dicky Bird Society is highly appreciated by those who acquire it, especially as it carries with it the privilege of adding the letters C.D.B.S. to the communications they forward to the Corner.

UNCLE TOBY'S POPULARITY.

The popularity of Uncle Toby has been attested in hundreds of ways during the years that the D.B.S. has been in existence. Songs in his praise began to be written and sung within a few months of the announcement of his enterprise. Since that time waltzes and galops have been dedicated to him; poems have been composed in his honour; and handsome coloured almanacs have shown him at large in the habit as he lived. Moreover, tradesmen and others have manufactured Uncle Toby Tobacco, Uncle Toby Albums, Uncle Toby Glasses, Uncle Toby Sweets, Uncle Toby Cakes, Uncle Toby Medals, Uncle Toby Brooches, Uncle Toby Suits, and Uncle Toby Antimacassars. All these evidences of the honour and estimation in which Uncle Toby and his movement are held, while gratifying to himself personally, are all the more gratifying as testimonies of the power and influence the Dicky Bird Society has acquired.

IMITATORS OF THE D.B.S.

The great and surprising success of the movement has naturally led other humane people to follow Uncle Toby's example. It has thus come to pass that Bands of Mercy, Bands of Kindness, and societies with similar names and objects, have been commenced in connection with large numbers of newspapers in various parts of the kingdom and of the world. The honour, however, of beginning this beneficent enterprise belongs to Uncle Toby. Although he claims that honour, he is none the less gratified to learn that others have followed in his footsteps—an Aunt Maggie here, an Uncle Robert there, and a Cousin Peter elsewhere. But the imitation of Uncle Toby was in one instance so palpably unfair that he found it necessary,

on his own account and on behalf of the thousands of children who had associated themselves with him, to enter a protest. A newspaper in Cheshire not only adopted our methods of organization, but actually appropriated the design which has for so many years ornamented the head of the Children's Corner. It is only fair to add, however, that the misappropriation was withdrawn, with sufficient apologies, when Uncle Toby pointed out the evident wrong that had been done to him and to the society.

A GREAT HONOUR.

A great and special honour befell Uncle Toby and the Dicky Bird Society in the August of 1879. Uncle Toby on the 29th of that month explained what it was.

"You know," he said, "that there is in London a distinguished association called the Royal Society for the Prevention of Cruelty to Animals. I say you know this, because I have told you something about the society before. It is composed of many hundreds of kind and humane people in all parts of the country. You would be amazed if I were to give you the names of the lords and ladies who belong to it. But when I say that it is called Royal because Queen Victoria is the patron of the society, you will quite understand what a splendid society it is. The object of all these ladies and gentlemen in uniting together is precisely the object which the members of the Dicky Bird Society have in view—only, of course, they do their work on a grander scale than we can do ours. They seek, as we of the D.B.S. do, to promote kindness to all living creatures. But they do more, for they try to prevent cruel men from ill-using poor dumb animals. And they have agents in all parts of the country—there is one in Newcastle—who, when cruel things are done, bring the people that are guilty before the magistrates. I need not tell you how much good is produced by the work of the ladies and gentlemen I have named. Well, this great society has sent to Uncle Toby, 'Founder and President of the Dicky Bird Society,' as they call him, a magnificent diploma in recognition of what they are pleased to call his 'valued assistance to the cause of humanity to animals.' I can't describe the beauty of the diploma, which is nearly as large as the *Weekly Chronicle* itself; but I may mention that it is signed by the Earl of Harrowby, the president of the society; by the Baroness Burdett-Coutts, the most famous philanthropic lady in Europe; and by the Rev. John Colam, the energetic secretary of the society. I must add, too, that Mr. Colam informs Uncle Toby that the diploma is the highest honour the society can bestow, and that the committee is so sparing of bestowing it that Uncle Toby's is only the forty-first that has been issued. Considering that the society has been so many years in existence, the honour is certainly unique. Uncle Toby is, of course, immensely proud of the distinction he has received; but he is not vain enough to believe that he is entitled to it all. Every one of his thousands of nephews and nieces shares it with him. It is to them even more than to himself that the honour has been done. For what could he have achieved without the willing and earnest help of the vast army of little folks in all parts of the country, and even in distant regions of the globe, who have joined the Dicky Bird Society?"

This, as has just been said, is what Uncle Toby wrote in August, 1879. The *Weekly Chronicle* was at that time one of the biggest sheets published; but it has now for some time past been altered in form and increased in number of pages, so that the diploma which Uncle Toby wrote about, is larger than two pages of the *Weekly Chronicle* of its present size. It will be seen that the diploma was signed by the Earl of Harrowby. That nobleman, however, is now dead, and his place has been

taken by Lord Aberdare. The inscription on the document is of course surrounded with beautiful designs of horses, dogs, birds, goats, lambs, and other creatures which the great society protects.

No. 41.

HONORARY DIPLOMA.

PRESENTED to UNCLE TOBY, Founder and President of the Dicky Bird Society, for his valued assistance to the cause of humanity to animals.

Signed,

HARROWBY.

BURDETT-COUTTS.

JNO. COLAM,

Secretary.

London :

105, Jermyn Street, St. James's,

August 16th, 1879.

THE INFLUENCE OF THE D.B.S.

The Dicky Bird Society has been so long in existence that many of its early members have now become the

fathers and mothers of other little members. During the years they have been propagating the great doctrine of kindness to all living things, Uncle Toby and his little friends have been the means of producing a marked change in the character and habits of young people. It is impossible to calculate the vast amount of cruelty that has thus been prevented. Certain it is that the lives of millions of birds have been saved through the influence of the D.B.S. Boys are no longer the little savages many of them were before we commenced our operations; girls have learnt that it is their duty to interpose and remonstrate when evil is being done. Cruelty is now recognised by both boys and girls as a cowardly sin—not only a sin against humanity, but a sin which justly brings into contempt all who commit it. Children who have early learnt the great principles which Uncle Toby has been week by week inculcating for so many years have necessarily become, when they have grown up, better husbands and wives, better fathers and mothers, better men and women in all the relations of life. It may safely and honourably be claimed, in fact, that Uncle Toby's vigorous and successful propaganda has been the means of making the world a sweeter and lovelier place for all that inhabit it.

Men of Mark 'Twixt Tyne and Tweed.

By Richard Welford,

AUTHOR OF "A HISTORY OF NEWCASTLE AND GATESHEAD," &c.

John Wykeham Archer,

ARTIST AND ANTIQUARY.

HE name of "J. Archer" appears upon four of the steel plate engravings which help to illustrate the "History of the County of Durham," projected and begun by Eneas Mackenzie, and completed by Metcalf Ross. This was the signature of John Wykeham Archer, a native of Newcastle, who from small beginnings rose to be a famous engraver on steel and wood, and a no less celebrated painter in water colours. He was born on the 2nd of August, 1806, and, after his school days were over, was sent to London, and bound apprentice to an old pupil of Thomas Bewick, John Scott, who had settled in the metropolis, and was carrying on a large business in book illustration. At the expiration of his apprenticeship, in the hope of finding an opening for his skill, Archer returned to his friends in the North, and it was at this period that the four plates above named, and a series of views of Fountains Abbey from drawings by Carmichael, were produced. Prospects of employment here did not

prove to be sufficiently promising, and in 1831 he went back to London, and joined the staff of the Messrs. Finden. He also plied the brush, and became an expert painter, selecting as his subjects, for the most part, relict of antiquity in and about London. Some of his water colours attracted attention, and a connoisseur in the Temple arranged with him for the production of twenty drawings a year. The commission was undertaken, and the pictures, full of architectural detail, are now in the British Museum—the property of the nation. Subsequently he became an Associate of the New Society of Painters in Water Colours. When Algernon, fourth Duke of Northumberland, succeeded to the estates of his ancestors in 1847, Mr. Archer was one of the many artists he commissioned to assist in restoring and beautifying Alnwick Castle, and in preserving the memorials of the past which are scattered up and down the wide-spreading domains of the Percy family. Mr. Archer's share of the work was sketching in regular order, and upon a uniform scale, for preservation and reference, ruins, curios, and other objects of antiquarian

interest upon the ducal estates between Tyne and Tweed. He refers to the undertaking in a series of gossip articles, illustrated by H. G. Hine, which he contributed to *Once a Week* in the summer of 1861. Thus:—

It was about the end of August in the year 18— that my friend H— [H. G. Hine] and I passed by the good ship City of Hamburg from the Thames to coal Tyne, and landing at Wallsend—a place of fame wherever a sea coal fire is appreciated—we trod Northumbrian ground, for the first time on the part of H—, but not so on mine, for there are few portions of that picturesque and historic land with which I am unacquainted. The object of our journey was that of a sketching tour, H— having in view the wild moorland scenery of Tyneside, the vestiges of antiquity in which the county abounds.

Some of Mr. Archer's work on steel may be seen in the *New Sporting Magazine*, many of his wood engravings are in the *Illustrated London News* and Blackie's "History of England," while thirty-seven of his etchings were issued in a folio volume by David Bogue, London, in 1851, entitled "Vestiges of Ancient London, a Series of Etchings from Original Drawings, with Descriptions and Historical Notes." Mr. Archer died in London on the 26th May, 1864. A small volume of his poems was published in 1873 by his son.

Adam Askew, M.D.,

THE WEALTHY PHYSICIAN.

The Infirmary of Newcastle was instituted in 1751, and first upon its roll of physicians—elected on the 13th April in that year—occurs the name of Dr. Askew. Bourne, writing his history of the town a few years earlier, and making honourable mention of the last official town's physician, adds: "Whilst I am on this, and commemorating a worthy physician of this great town, I must not omit to observe that this place was probably never better served this way than at present. The following gentlemen, viz., Adam Askew, M.D. [and three others] are men most eminent in their profession, and shine among the crowd of those who always frequent a place so populous."

Adam Askew was a son of Anthony Askew, a physician at Kendal, and a descendant of an ancient and honourable Cumberland family. He was born there in 1694, adopted his father's profession, graduated M.D. at St. John's College, Cambridge, came to Newcastle in 1725, and by remarkable skill and good management acquired a practice that extended over the four northern counties, brought him great wealth, and gave him the reputation of being "one of the most eminent physicians in the kingdom."

In 1740, the doctor purchased the ground overlooking the Close and the river upon which the convent of the White Friars stood, and built a handsome house, in the kitchen of which some vestiges of the windows of the ancient edifice were allowed to remain. His country residence was at Whickham. He had also the beautiful

mansion of Redheugh, on the Gateshead side of the Tyne, facing Elswick, which he bought in 1748 from Lady Mary Radcliffe for his son Henry. On the death of his father the estate of Storrs Hall, in Lancashire, came to him; it was the inheritance of his mother, Anne, daughter of Adam Storrs, of that place. Some of his increasing wealth he invested in the purchase of the Widdrington lands at Ellington and Linton, near Morpeth, forfeited by Lord Widdrington in the Rebellion of 1715; the manors of Nettlesworth, Holemyres, and Brodemyres, near Chester-le-Street; and the estate of Middleton Hall, near Kirkby Lonsdale. Thus he became a considerable landed proprietor in several counties. So rapid a rise to fortune had seldom been seen even in Newcastle, where by lucky speculations in coal or corn sudden affluence was not altogether a phenomenon.

Dr. Askew was a man of marked individuality of character, with a genius for making money and great foresight in investing it. During his career in Newcastle, and for long after, many amusing anecdotes were told respecting him. They all tend to show that he was a strong-minded and strong-speaking man, "full of life, pleasure, and bustle, very prompt and decisive in all his proceedings, but no way remarkable, when he chose for urbanity of manners or choice of words."

Lord Eldon, in his "Anecdote Book," tells the following story about the doctor, and the acquisition of one of his estates:—

There was an attorney at Newcastle when I was a boy at school, not of a very popular character for integrity. The leading and eminent physician of that day, there, was Dr. Askew. A gentleman in extreme bad health came into that country to sell an estate before he died. He sent for the attorney upon the business of selling the estate—first about advertising it for sale, and adopting all other proper means for obtaining a reasonable price. The attorney, who, it was said, well knew the estate and its value, told the gentleman he was willing to give him a sum he named, which he assured him was its full worth, and if he would take that sum he would give it him, and all further trouble might be saved. This was agreed to, and the attorney went to his office to prepare articles to be signed and sealed. The gentleman, having thus taken care of his estate, turned his attention immediately to the care of his diseased body, by sending for Dr. Askew, and desiring his immediate attendance. The doctor came quickly, and after asking a few questions as to the state of the gentleman's health, inquired what had brought him in such a state into that country. This led to the doctor's learning that he had come there to dispose of the estate, which was in Northumberland. The doctor said he should be very glad to buy the estate; but he was informed by the patient that it was sold to the attorney. "Then," said the doctor, "thou art probably cheated. I'll give without a word more £2,000 beyond what the attorney has offered." The gentleman was scrupulous about accepting this second offer, but he overcame his scruples. The doctor then took pen and ink and paper and wrote himself a short but sufficient article of sale and purchase, and both signed it. Soon after the attorney entered the room, with his intended written contract; but, finding himself too late, he began to abuse the doctor most unmercifully for cheating him out of the benefit of his bargain. "Scold on," says the doctor. "Do you imagine that anybody will think

that I have done wrong if I have cheated thee, a lawyer, who has cheated all the rest of mankind?"

Dr. Askew resigned his office of physician to the Infirmary in 1771, and died at his house in Westgate Street, Newcastle, on the 15th of January, 1773, in the 79th year of his age. He was buried at St. John's Church with much ceremony, the pallbearers being Sir Walter Blackett, Bart., Christopher Fawcett (Recorder of Newcastle), Matthew Ridley, Ralph William Grey, Edward Collingwood, Matthew Waters, Gawen Aynsley, and Charles Thomas Bigge.

By his marriage with Anne, daughter and co-heir of Richard Crackenthorpe, of Newbiggin Hall, Westmoreland, the doctor had four sons and two daughters. The daughters died unmarried; his eldest son, Anthony, inherited great part of his father's fortune; his second son, the Rev. Adam Askew, rector of Plumbländ, near Maryport, obtained the Middleton property; Henry, the third son, retained Redheugh; and John, the fourth son, married an heiress and settled at Pallinsburn, near the Border.

Anthony Askew, M.D.,

PHYSICIAN AND BIBLIOPHILE.

Three years before Dr. Adam Askew and his wife came to Newcastle to settle, the first son of their marriage, named, after his grandfather, Anthony, was born. Anthony's early education was conducted partly at Sedberg and partly at the Royal Free Grammar School of Newcastle, of which latter institution, when the boy was sixteen years of age, Richard Dawes became head master. A few months' study under the tutelage of that eminent Grecian developed a strong bias which he had already shown towards classical literature, and he became an excellent Greek scholar. His father, on presenting him to the schoolmaster, "marked those parts of his back which Dawes, who was celebrated for his unsparing use of the birch, might scourge at his pleasure, excepting only his head from the discipline," and Askew was accustomed to relate in after life the terror with which he saw for the first time that famous pedagogue. In due time he proceeded to Emanuel College, Cambridge, where his proclivities were encouraged, and he began to collect books and manuscripts relating to his favourite studies. In 1745 he graduated B.A.

Dr. Askew was realising, in the practice of medicine in Newcastle, as we have seen, Dr. Johnson's definition of a very different calling:—"the potentiality of growing rich beyond the dreams of avarice," and he determined that his heir should share in the good things that fell to a successful practitioner's lot. As soon, therefore, as he had finished his colligate course at Cambridge, Anthony was sent to the University of Leyden. While there, in 1746, he issued proposals for publishing a new edition of

Æschylus, and printed a specimen of his intended work in a small quarto pamphlet. It consisted of 29 lines of the Eumenides, with various readings from his MSS. and printed books, and was dedicated to Dr. Mead, the celebrated physician.

Having studied a year at Leyden, Mr. Askew went in the suite of the British Ambassador to Constantinople. He remained abroad till 1749, visiting Athens and Hungary, and returning home through Italy and France. In Paris, where he was elected a member of the Academy of Belles Lettres, he had an opportunity of purchasing several MSS., early editions of the classics, and valuable books in various branches of science. In 1750 he took the degree of M.D. at Cambridge, and commenced practice there. Soon afterwards, having been admitted a Fellow of the Royal Society, he removed to London; was a candidate of the College of Physicians, 25th June, 1752, and a fellow 25th June, 1753. The following year he was elected physician to St. Bartholomew's Hospital. He delivered the Harveian Oration of the College of Physicians in 1758, was censor in 1756, 1761, 1764, and 1767, and registrar from 1767 to his death.

Upon Dr. Askew's settling in London he was visited by all who were distinguished for learning or curious in the fine arts. His house in Queen's Square, we are told, was crammed full of books from cellar to garret, and the wags of the day used to say that half of the square itself would have done so before the book appetite of Dr. Askew would have been satisfied. He was the first, or one of the first, who brought bibliomania into fashion. The eager delight with which he produced his rare editions, his large paper copies, his glistening gems and covetable tomes would have raised him high in the estimation of the Roxburgh Club. Some, indeed, were of such great rarity that he would not suffer them to be touched, but would show them to his visitors through the glass cases of the cabinet of his library, or, standing on a ladder, would himself read aloud portions of these inestimable volumes.

The year after Askew's death, which occurred at his house in Hampstead on the 27th February, 1774, his valuable library was sold by auction. The king bought to the amount of £500, Dr. Hunter the same. De Bure, who had commissions from the King of France, and many foreign collectors, purchased to a similar extent, and the trustees of the British Museum bought extensively. A curious and valuable account of the sale appears in the *Gentleman's Magazine*, vol. xiv., p. 284.

Dr. Askew married, first, Margaret, daughter of Cuthbert Swinburne, of Longwinton, by whom he had no issue. His second wife, Elizabeth, was a younger daughter of Robert Holford, Master in Chancery, a woman described by Dr. Parr as possessing "celestial beauty and celestial virtue." She died on the 2nd of August, 1773, aged 38, leaving him with twelve children. When he himself

died, the year after his father, the oldest of his family was under twenty years of age, and his brother, Henry Askew, of Redheugh, became their guardian. The paternal care which Henry exercised over his nephews and nieces is commemorated upon the beautiful monument which they erected in his honour in the church of St. Nicholas, Newcastle.

A fine portrait of the doctor, engraved by Hodgetts, from the original in Emmanuel College, Cambridge, is published in Ames's "Typographical Antiquities." From this engraving our copy is taken. There is also a



clay model of him (made by a Chinaman under somewhat whimsical circumstances) in the Royal College of Physicians, presented by his daughter, Lady Pepys, widow of Sir Lucas Pepys, Bart., M.D. On a marble tablet in Hampstead Church is his epitaph, "Sacred to the memory of Anthony Askew, D.M., F.R.S., who exchanged this life for a better, the 28th day of February, 1774, in the 52nd year of his age."

Sir Henry Askew, B.C.B.,

A PENINSULAR WARRIOR.

John, fourth son of Dr. Adam Askew, married Bridget, only surviving child and heiress of John Watson, of Newcastle and Goswick, by Elizabeth, daughter of John Craster, of Craster, and widow of Christopher Blackett, of Newham. By this marriage he acquired the greater part of the manor of Goswick, which, united with Pallinsburn, his own property, gave him a considerable estate, and enabled him to carry out schemes of agricultural improvement that excited considerable interest

among the landowners and farmers of his day. He died in October, 1794, aged 62, and was buried at Holy Island; his wife survived him till 1823, and was buried beside him at the age of 81. Their family consisted of seven sons and two daughters. The eldest, George Adam Askew, married his cousin, Elizabeth, one of the twelve orphan children of Dr. Anthony Askew. He and his wife erected the monument in St. Nicholas' Church to the memory of their uncle Henry of Redheugh. Another son, Richard Craster Askew, barrister-at-law, resided for many years in Newcastle as a chamber counsel and conveyancer, and for a short time was Recorder of the borough. The third son, Henry, whose name heads this sketch, entered the army.

Henry Askew was born on the 7th of May, 1775, and, upon leaving school, at the age of 18, joined the First Regiment of Foot Guards. He was promoted to be captain on the 18th of May, 1795, lieutenant-colonel on the 22nd August, 1807, colonel on the 4th of June, 1814, major-general on the 19th July, 1821, and lieutenant-general on the 10th June, 1837. He served with credit in Holland and Flanders from July, 1794, to April, 1795, in Sicily and the Mediterranean during 1806 and 1807, and with the expedition to Walcheren in 1809. Embarking for the Peninsula in September, 1812, he was at various engagements in Spain, Portugal, and the south of France, commanded the 1st Battalion of the Grenadier Guards at the passage of the Bidassoa, and distinguished himself at the battles on the Nivelle and the Nive (for which he obtained a medal), at the passage of the Adour, and the blockade of Bayonne. He was also prominently engaged in the campaign of 1815, and was severely wounded at Quatre Bras, where he commanded the 2nd Battalion of the Guards, and won a Waterloo medal. On the 25th July, 1821, the king conferred upon him the honour of a Military Knight Commander of the Bath. He died at Cologne, without issue, on the 25th of June, 1847, and was buried at Ford on the 14th July, where there is a stained glass window to his memory.

Sir Henry Askew's estate of Pallinsburn, which he inherited by the death of his elder brother in 1808, descended to his younger brother, Richard Craster Askew, the Newcastle barrister, who, dying there in 1851, was succeeded by his nephew Watson Askew, Esq., the present proprietor.

Sir Aymer de Athol,

LORD OF JESMOND AND PONTELAND.

Through the long reign of Edward III., past that of Richard II., and into the early years of the monarchy under Henry IV., lived Sir Aymer de Athol, a Scottish knight, owning extensive possessions in Northumberland, and filling various offices of State there. David, eleventh Earl of Athol, was his father; his mother, the countess,

was a daughter of John Cumin, claimant to the Scottish Crown, whose murder by Robert Bruce led to the expedition against Scotland in which Edward I. died. Hodgson, in compiling a pedigree of the Lords of Melford, found among the Rolls of Scotland several notices of Sir Aymer's early and middle life. Among them were entries showing that in 1344 he was put at the head of the men of Tindale, and had a ship allowed him at Newcastle to convey provisions for them to the seat of war in Scotland; in 1345 was in the commission of array in Northumberland; in 1347 was made Sheriff of Dumfries, authorised to receive Scotchmen into fealty with Edward III., and empowered to repair the castle of Dalswinton; and that in 1352 the English monarch, styling him "beloved cousin," gave him a protection for persons he was about to send into Ireland to purchase provisions for his household, then resident in Scotland. From other sources it is known that in 1381 he was Sheriff of Northumberland, that in the same year he and Sir Ralph Eure were elected knights of the shire for the same county, and that during their attendance in Parliament, they each received four shillings a day out of a rate levied upon the several townships of the county for the special purpose.

Sir Aymer de Athol was twice married, first to Eleanor (widow of Robert Lisle, of Woodburn), sole daughter of Sir Robert Felton, Kt., and Eleanor, daughter of Sir Thomas Greystock; second, to a lady whose Christian name was Mary, but whose maiden name is unknown, though it is believed she was a daughter of the Countess of Pembroke. When, in 1386 or the beginning of 1387, he lost his lady, he buried her within the church of St. Andrew, in Newcastle. On the 9th of July, in the latter year, Bishop Fordham issued from Gateshead an indulgence of forty days to every one who, confessing his sins in contrition and penitence, should contribute towards reparation and emendation of St. Andrew's, or should present to the chapel of the Holy Trinity, in the northern part of that church, gold, silver, vestments, books, chalices, and any other ornaments, or who, before the altar of the Holy Trinity, should pray for the health of Sir Aymer de Athol, Knight; for the soul of Mary, his wife, whose body reposed there; and for the soul of Aymer, his son.

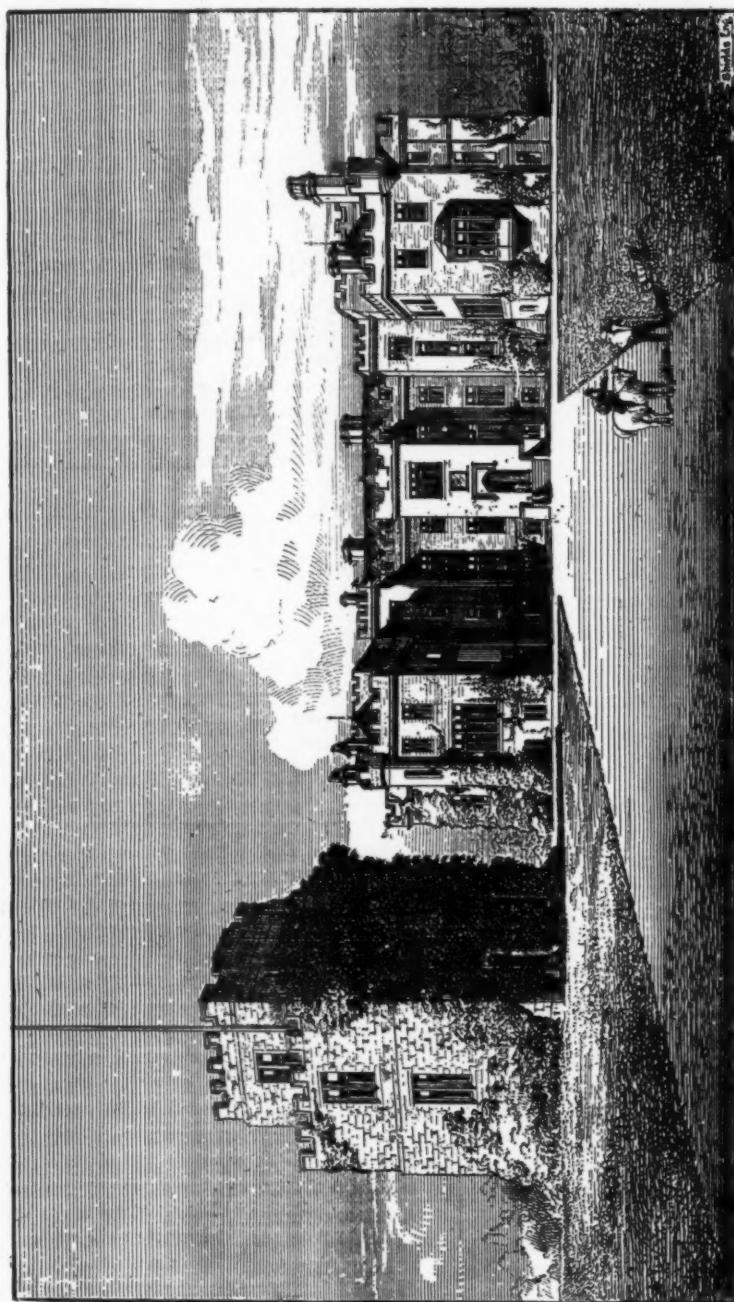
The year following the indulgence at St. Andrew's was one of disaster to the fighting men of Northumberland, and to Sir Aymer de Athol. In the month of August, he was living in his fortalice at Ponteland, when, in the early morning, he found himself besieged by the Scots under Earl Douglas, then on their way from Newcastle to Otterburn. He and his retainers made a gallant defence, but they were overpowered by numbers, and, "after a sharp assault," the tower was captured, and Sir Aymer taken prisoner. With their captive in safe custody, the Scots marched to Otterburn, and fought the fight which a dozen ancient ballads have rendered

famous. When the battle was over, Sir Aymer was one of the numerous knights who were held to ransom,—one of those unfortunate persons who had to purchase their freedom at a price which was measured by their means. How he accomplished his freedom is not known, for after the battle history is silent respecting him. He lived for fourteen years, and at his death (in 1402) was buried beside his second spouse in the church of St. Andrew. Over their remains was placed a massive monument, upon which their effigies were depicted in brass—hers in appropriate costume, his as a knight in armour, with a sword in his left hand, and a dagger in his right, and his feet reposing upon the back of a leopard. Whosoever cares to learn the fate of the monument may turn to the 93rd page of the "Life of Ambrose Barnes," and read what Mr. Longstaffe and Mr. Clephan have written about it.

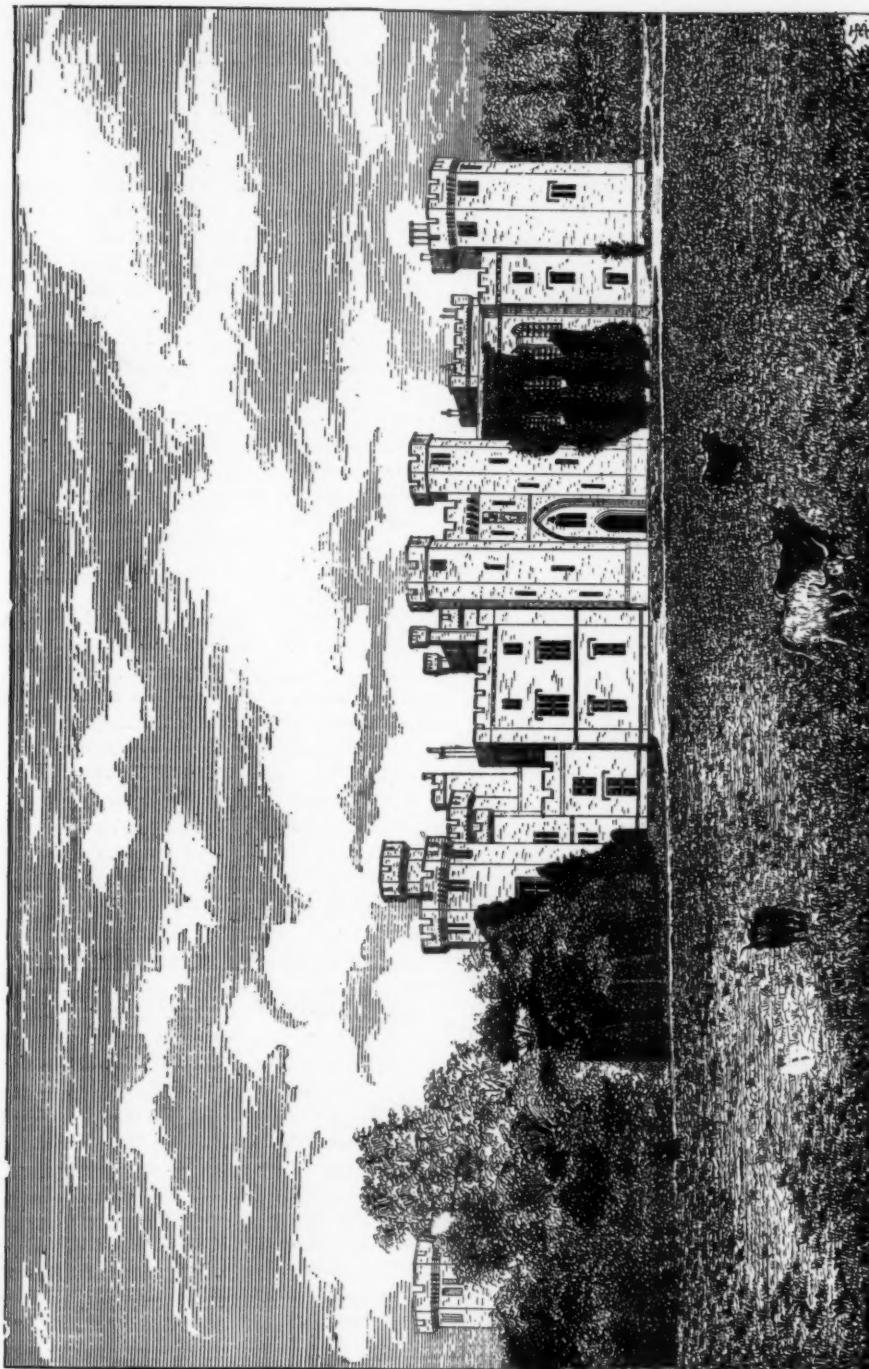
By his second wife Sir Aymer had a son and two daughters. The son died, as we have seen, before his mother; the daughters were married—Isabella to Sir Ralph Eure, and Mary to Robert Lisle of Felton. Upon them and their husbands he entailed the manor of Felton, granted to him in reversion after the death of the Countess of Pembroke. The manor of Ponteland he held for life only, the reversion of it belonging to Sir John Scrope, Knight. About his Jesmond property there is no evidence. He held only a part of the manor, and perhaps, as at Ponteland, had but a life interest in it. Gray, in the "Chorographia," states that "Adam de Athol of Jesmond" gave the Town Moor to Newcastle, and Bourne devotes a page of his history to prove that Gray's statement is incorrect.

Ford Castle.

ELAND describes "Foord Castle, in Glyndale, upon the east syd of Tille," as "metely stronge, but in decay." It was the seat of Odonel de Ford in the time of King Edward I.; and Odonel's daughter and heiress, Mary, becoming the wife of one of the Herons of Hadstone, carried it into the hands of a junior branch of that old Northumberland family, who continued to hold the vill and manor for many generations. Sir William Heron embattled his mansion-house of Ford (built, it is said, in the year 1287) by virtue of a licence obtained in the twelfth year of Edward III. (A.D. 1338), and that prince, two years afterwards, granted to him and his heirs to hold it "by the name of a castle" for the defence of those parts against the Scots. He also acquired a grant from the Crown of a weekly market and an annual fair at Ford; likewise liberty of free warren in this and his other lordships of Crecum (Crookham), Kynmerston (Kimmerston), and Hetpole (Heathpool). The same personage was captain of the castles of Bam-



FORD CASTLE, 1887.



RAVENSWORTH CASTLE, 1887.

borough, Pickering, and Scarborough, also warden of the forests north of Trent, and high sheriff of Northumberland, for eleven years together, in the same reign. One of his successors was summoned to Parliament among the barons; several of them filled the office of high sheriff of the county; others suffered considerably in the Wars of the Roses; and the last of the male line, William Heron, having been killed by John Manners, of Etal, his nearest neighbour, his daughter, Elizabeth, who became the wife of Thomas Carr, of Etal, brought Ford Castle and manor into her husband's possession, but not without a bloody feud with George Heron, of Chipchase, who set up a claim to them under an alleged deed of entail, but was worsted in the plea. Thomas Carr's daughter and heiress married Sir Francis Blake, knight, whose daughter, Mary, married Edward Delaval, grandfather of Lord Delaval (Sir John Hussey Delaval, Bart.), who bequeathed Ford to his relict, Lady Delaval, with remainder to his granddaughter, Lady Susan Carpenter, whose mother, his sixth daughter by his first marriage, Lady Sarah Hussey Delaval, had married George Hussey, second Earl of Tyrconnel, but had no male issue. Lady Susan became the wife of Sir Henry de la Poer, second Marquis of Waterford, in 1805; and her mother having died in 1822, Ford came into the Waterford family.

From its situation so near the Scottish Border, Ford Castle was frequently assaulted, during the old troublous times, by invaders from the North. In the year 1385, the Scotch, under the Earls of Fife, March, and Douglas, crossing the Western Border, plundered and laid waste the country as far as Newcastle, and are said to have taken and demolished the castles of Ford, Cornhill, and Wark, on their return home. Previous to the battle of Flodden in 1513, James IV.'s troops assaulted and took Ford Castle, wherein, unhappily for himself, the King of Scots found Elizabeth, the wife of the castellan, Sir William Heron, who was then a prisoner in Scotland, together with their daughter, a lady of great beauty; and the amorous monarch was so fascinated by the charms of this fair Northumbrian Circe that he stayed inactive in the castle for several days, enjoying the company of the ladies, and thus gave the Earl of Surrey time to come up by forced marches to bar his further advance and seal his fate. In 1549, the Scotch, under the command of D'Esse, a French general of great military skill, made an incursion into Glendale with a considerable army, carrying with them four fieldpieces. In this expedition Ford Castle was once more attacked, and the greater part of it taken and burnt; but Thomas Carr, its governor, retired into one of its towers, where he defended himself so bravely that the besiegers were obliged to retire, leaving it unreduced.

In the year 1761, Sir John Hussey Delaval commenced the building of the present edifice, and completed the work within three years, preserving in it as much as

possible the ancient architectural style and taste. Indeed, the two towers, respectively on the east and west fronts, belong to the mediæval mansion, and the restorations were so skilfully managed as to create a nearly harmonious whole. The centre of the front, which is towards the south, is formed by a semi-hexagonal projection, and its terminations are square turrets, from whence, on each hand, a regular wing is advanced. On the west side of the area in front is an old square tower of a singular form, composed of two turrets, one rising above the other, and the upper one so much less than that which supports it as to afford a spacious battlement. The castle commands a fine prospect of the valley of the Till as far as Wooler southward; and to the westward there is a near view of the heather-crowned hill of Flodden, at the foot of which King James and his nobles fought against fate, "till the enclosing night hid foe from foe." A dozen miles to the south-west the prospect is closed in by the lofty Cheviots. Standing in the midst of a finely cultivated plain, upon a bold ascent about a mile in length, the situation of the castle is commanding and dignified, "in the centre," as William Howitt says, "of a most exhilarating natural environment, consisting of lofty, wild, and rugged hills and fine belts of wood."

The interior presents many objects of interest, including portraits of Lord Delaval and Lady Delaval; their grand-daughter, Lady Tyrconnel; her cousin, Lady Audley, daughter and co-heiress of the second Lord Delaval; Admiral Delaval; Sir Ralph and Lady Milbanke, the parents of Lady Noel Byron, connected with the Delavals by the marriage of Sir Ralph's grandfather with a lady of that spendthrift family. The room is shown in which the unfortunate King of Scots is said to have slept during his fatal few days' sojourn at Ford. It had been shut up, we are told, ever since the battle of Flodden till opened out some twenty or twenty-five years ago.

Ravensworth Castle.



AVENSWORTH CASTLE, near Gateshead, the residence of the Earl of Ravensworth, stands on the side of a hill which slopes gradually towards the river Tees. The original structure seems to have consisted of four towers, connected by a regular curtain, and probably including a keep or central tower. Buck's View, in 1728, exhibits the towers with a perfectly modern building betwixt them. But in 1808 nearly the whole of the old house was taken down, except two of the towers, which are incorporated in the offices. One of them is covered with ivy, and has a fine effect as seen through the adjoining plantations.

The present edifice was erected on a plan furnished by

John Nash, the builder of the Pavilion at Brighton. It consists of a selection from the castle architecture of various periods, not unskillfully brought into contact. The most incongruous part of the combinations seems to be the introduction of the square-headed windows belonging to the time of James and Elizabeth. But the principle of utility perhaps justified this obvious deviation from purity of style. The castle has three fronts, and the various towers and façades have a pleasing effect.

A number of valuable pictures are distributed amongst the chief apartments, including a battle piece by Salvator Rosa, a Magdalen by the daughter of Carlo Dolci, a portrait of a lady by Sir Peter Lely, a landscape by N. Poussin, &c. Amongst the other curiosities which abound here are a model of the castle itself by Dodds, a model of St. Peter's Church at Rome, and another of St. Paul's Cathedral, London.

The castle is sheltered on the north by a fine forest of oaks and evergreens, which cover the rising grounds and impart to the whole a rich and warm appearance. Some fine specimens of the cedar of Lebanon are to be found in the park, while a venerable oak, twenty feet in girth, and an old stone cross of great antiquity, grace the lawn.

The Early Press of York.

By James Clephan.

HE civil war of the seventeenth century brought the printer to Newcastle; but in an earlier era, when the press was unknown on the Tyne, it was in motion in other parts of England. York, for example, had associated itself with the new art even in the lifetime of Caxton. The admirable "Memoir of the York Press," by Robert Davies, F.S.A., which was published in the year 1868, establishes the fact.

It need hardly be repeated that the art was brought into England in the time of Edward the Fourth. The short reign of his brother was also made memorable by the encouragement which it gave to the printing press. "In what sort Italian Merchants may sell Merchandise," occupied the thoughts of the first and only Parliament of Richard III. With its "Restraints of Aliens," the statute of the last of the Plantagenets (1 Richard III., cap. 9), made in 1483-84, was far from being a measure of Free Trade; but it closed with a proviso that its enactments should not operate "in prejudice, disturbance, damage, or impediment to any artificer, or merchant stranger," of whatever nation or country soever, "in bringing into this realm, or selling by retail or otherwise, any books, written or printed," "or any

scrivener, alluminor, reader, or printer of such books." The produce of their art they might "sell by way of merchandise"; and they should also dwell in the land "for the exercise of their occupations."

Thus did Parliament legislate in the year 1484, at a time when printed books had risen up in competition with those that were written. Mr. Davies informs us, in his "Introduction," that in the reign of Edward III., "at least a century and a half before the art of printing was introduced into the city of York, the number of secular persons who, under the denomination of *scriptores*, *escriveneres*, or text writers, were there engaged in the production of manuscript books, had become so considerable, that they obtained from the governing body of the municipality the privilege of forming themselves into a separate company or incorporation, and of framing their own ordinance or code of bye-laws. The conventional *scriptoria* had long ceased to be the only places where books were made and multiplied."

Artisans whose occupations were connected with the mechanical parts of literature settled in York, and acquired the city franchise. There were also many others by whose skill and taste the manuscripts were to be decorated. Limners or enluminers, notours (who introduced the musical notation), turnours, and flourishers, were admitted to the incorporated society of text-writers. "During the fifteenth century the business of the text-writer continued to prosper at York. When a taste for the external adornment of books began to prevail, the craft of the bookbinders increased in number and importance, and they were allowed to become a separate company, and to be governed by their own code of bye-laws" (their "ordinance" being confirmed by the Corporation in 1476). From one of their rules "it is obvious that they were booksellers as well as bookbinders."

In the spirit of the proviso of 1 Richard III., Frederick Freez was enrolled in 1497 as a freeman of York. His designation was that of a "Bokebynder and Stacyoner," but he afterwards occurs as a "Buke Prynter." "A Dutchman and an alien," he had kindly welcome in his adopted city. Unhappily, however, the two sons born to him there, Valentine and Edward, were both of them "the victims of religious persecution." Valentine, a "cordyner," admitted to the freedom of the city by patrimony in 1539, was burnt for heresy at Knavesmire, he and his wife dying at one stake! Gerard Freez, or Wanseford, brother of Frederick Freez, dealt in books at York on a large scale.

Hugo Goez, said to have been a son of Matthias Goez, or Vander-Goez, an eminent printer at Antwerp, also established a press in York during the reign of Henry VII. In the time of Henry VIII., "Ursyn Milner, Prynter," was admitted to the freedom of York (1516), and followed the craft of a bookbinder. At the same period, John Gaschet, or Gachet, originally a stationer at

Hereford, opened a shop in York as bookseller, carrying on business in the Cathedral Close. "Copies are extant of six service-books printed for the use of the church of York, and published by John Gachet," from 1516 to 1530.

In the chapter of Mr. Davies's "Memoir," headed "1530-1640," he observes:—"It is not known that any books were printed or published at York for more than a century after the date of Gaschet's latest publication. From the period of the Reformation until far into the reign of Queen Elizabeth, it appears to have been the object of legislation, as well as the policy of the Government, to discourage the exercise of the art of printing in the provincial towns, and to limit as much as possible the circulation of printed books throughout the country. In the year 1533, the Parliament of King Henry VIII. repealed that clause of the Act of the 1st Richard III. which had largely contributed to the general diffusion of literary knowledge in England during the preceding fifty years." Printing was exercised in Ipswich, Worcester, Canterbury, and Norwich, from 1548 to 1568; but "these are almost the only known examples of the existence of provincial presses in England between the passing of the Act of the 25th Henry VIII. and the close of the reign of Elizabeth, except those of the two Universities, to which the privilege of printing was granted by a decree of the Court of Star Chamber in the year 1585." The statute of Henry (1533) declared that since the making of the Act of Richard III. there had come into the realm a marvellous number of printed books, and many of the king's natural subjects had given themselves so diligently to learn and exercise the craft of printing that there were now in England a great many persons as cunning and expert therein as any strangers elsewhere. A policy of exclusion, restriction, and monopoly now set in. By injunction of 1539 none must print English books unless first examined and licensed by the Privy Council or others appointed by the king; and the charter of 1556, granted to the Company of Stationers in London, made it unlawful for any one not a member or authorised by the Crown to set up a press in any part of England. In 1567, two members of the London Company were sent down to York, and cited four stationers before the Archbishop and others, to answer as to the possession of Roman Catholic books. Some of those named in the interrogatories were found on their premises, and forfeited. No severer penalty befell the offenders; but "that this display of the suspicious and arbitrary temper of the Government operated as a discouragement of the trade of book-selling at York, is evident from the fact that not more than four or five stationers were admitted to the civic franchise during the remaining part of the reign of Elizabeth." Early in the reign of her successor, Thomas Gubbay, an able and eminent London stationer, was admitted to the

freedom of York; and, by way of encouragement, twenty nobles of the twenty marks forming the price of his enfranchisement were abated. The authorities were laudably anxious to promote a revival of the trade in books within their jurisdiction; and in the course of the next few years they allowed other stationers, not freemen, to establish places of business in the city. Shops had also been opened, in the latter years of Elizabeth, by two or three booksellers, within the Cathedral precincts, where they could carry on their vocation without being free, and without being liable to municipal burdens.

"About the middle of the reign of King Charles the First, that mighty engine of liberty, the printing press," says Mr. Davies, "was again introduced into the Northern Counties of England; and, strange to say, it was planted there by the hands of the arbitrary monarch himself. In his progress to Scotland in the year 1639, Robert Barker, the king's printer, was in the royal suite, and took with him his press and types. Before the king advanced farther north, he spent nearly a month at York, and from thence he issued his famous proclamation 'for the suppression of various monopolies.' Although no evidence of the fact has hitherto appeared, it is highly probable that the royal press was employed at York in publishing to the world this proof of the king's 'care and providence for the public good of the people.' The king proceeded from York to Newcastle, and a few tracts are yet extant which show that the royal press was at work there for a short time."

Since the date of Mr. Davies's "Memoir" (1868), the Calendar of State Papers (1873), comprising six months of the year 1639, makes us aware that the king had arrived in York without a press, and that, by his Majesty's instructions, the Earl of Arundel and Surrey (Thomas Howard), Lord General of the Army in the North, wrote thence to Sir Francis Windebank, Secretary of State, on the 20th of April, that "a printer with a press" might be sent down "with more than ordinary diligence, the want being daily found so great." This was done; but Charles had left York, and passed Durham, before "the printer, with all his trinkets," was ready for the royal service. It was at Newcastle, early in May, that the press of 1639 was first at work. (*Archæologia Eliana*, vii., 271, N.S.)

In the spring of 1642, Charles and his Court were established in York; and near the royal residence the king had his press set up, and it was in constant requisition during his stay. "The tracts which issued from the royal press at York are specimens of neat and accurate printing. A distinction is uniformly made between those parts of which his Majesty was the author, and those which were the production of the Parliament, the former being always set up in a tall, well-formed black-letter." In the autumn, the king's press was transferred to Nottingham; but, some time previous, Stephen Bulkley had appeared in York as a

printer. Bulkley exercised his art in Newcastle also. Thither he was summoned in 1646 by the king; and there he printed, in 1649, Grey's "Chorographia."

After Marston Moor, the Puritan party set up in York a printer and a press of their own. This was Thomas Broade. He was succeeded by Alice Broade, presumably his widow, who "occupied the printing office opposite the Star Inn in Stonegate, where he originally practised his art, in the year 1644. The city of York had the good-fortune still to enjoy the privilege of being the only place out of London (except the two universities) in which a printing press was allowed to be set up. An Act passed in 1662, 'for regulating of printing and printing-presses,' contained a proviso that it should not extend to restrain the keeping and using of a printing-press in the city of York, so as all books of divinity there printed should be first licensed by the Archbishop of York for the time being, or such person as he should appoint; and all other books whatsoever there printed should be first licensed by the person to whom the licensing thereof did appertain according to the Act." (13 and 14 Charles II., cap. 33.)

Stephen Bulkley, who had returned from Newcastle to York after the Restoration, died in that city early in 1680; and before the end of the year, John White, "late of London," was setting up his press near the Minster. "On the 9th of November, 1680, he was married, at the church of St. Michael-le-Belfrey, to Hannah Broade, of that parish, who was most probably," as Mr. Davies conjectures, "a daughter of the York printers, Thomas and Alice Broade. The prospect of succeeding to an established business had, doubtless, some influence in bringing the London printer to York, and inducing him to enter into the holy state of matrimony after he had passed the period of middle life." Of John White, who died in January, 1715, we have written so recently that we need say no more here. (See *Monthly Chronicle*, vol. i., p. 317.)

Grace White, widow of John White the elder (who was twice married), "is entitled to be held in grateful remembrance by the people of York." Succeeding her husband in his business, "she was the first to introduce to them that 'all-powerful instrument of modern civilization,' the newspaper—

that map of busy life,
Its fluctuations and its vast concerns.

She was probably encouraged to embark in this novel enterprise by the example of her late husband's son, Mr. John White, of Newcastle-upon-Tyne, who, in the year 1708, had established himself in that thriving seaport as a printer and bookseller, and in the year 1711 set up a weekly newspaper there, which he denominated the *Newcastle Courant*." Mrs. Grace White's journal, the *York Mercury*, made its first appearance February 23, 1718-19. Associated with her in the imprint is "Thomas

Hammond, jun., bookseller," who was a member of the Society of Friends.

Charles Bourne, on the death of Mrs. Grace White in 1720-21, succeeded her in the business, under the will of his grandfather, her husband, made in the year 1714; and within a few months of her death, he married her hand-maiden, Alice Guy, who had been kindly remembered in death both by John and Grace White. Bourne not did long survive. He died in August, 1724, bequeathing all his property to his "dear and beloved wife, Alice Bourne."

Now comes Thomas Gent, "whose name has obtained wider celebrity than that of any other York typographer. Author, printer, and artist, his labours extended over more than half-a-century; and during that period many of the numerous publications of his pen, both in prose and verse, were printed at his own press, and embellished with engravings executed by his own hand. His works are, for the most part, below mediocrity; yet they possess a certain quaintness and eccentricity of character which are not without their charm." So great, indeed, is the charm of his autobiography, that with difficulty we refrain from following him through his varied fortunes. It was in the spring of 1714 that he journeyed from London to York, "walking the greater part of the way." His amusing account of his first introduction to the venerable York printer, John White, has (as Mr. Davies states) been often quoted:—"The door was opened by the head-maiden, who is now my dear spouse. She ushered me into the chamber, where Mrs. White lay something ill in bed; but the old gentleman was at his dinner by the fireside, sitting in a noble arm-chair with a good large pie before him, and made me partake heartily with him. I had a guinea in my shoe-lining, which I pulled out to ease my foot, at which the old gentleman smiled, and pleasantly said it was more than he had ever seen a journeyman save before." The thrifty workman was at once engaged for a year, "and lived as happily as he could wish in this family," of which "Mrs. Alice Guy, upper-maiden to Mrs. White," was a member, who not only caught the fancy of the young printer, but "had captivated others, and particularly (he says) my master's grandson, Mr. Charles Bourne, who was more deserving than any." At the end of his year, Gent, declining a further engagement, left York for his native Ireland, parting from the "lovely young creature" that remained behind, and "receiving a little dog from her as a companion on the road." He "had the honour to be accompanied as far as Bramham Moor by his rival"; and other companions, also, escorted him on the way. Would space permit, we would accompany him to the end of his pilgrimage; but those who would know more of Thomas Gent must read his "Life," written by himself in 1746, and published in 1832, and turn also to the "Memoir of

the York Press" by Mr. Davies. They will there learn the history of a printer who died about a hundred years ago, at the age of 86, a citizen of London and of York; and they will see how it came about that Mrs. White's comely maiden first married her master's grandson, and then became the wife of the young printer for whom she had opened the door.

Elihu Burritt in the North.

ELIHU BURRITT, the learned American blacksmith, wrote a very readable and entertaining book (published in 1864) entitled, "A Walk from London to John o'Groat's, with Notes by the Way." It had been the author's intention, on his first visit to England in 1846, to make a pedestrian tour from one end of the island to the other, that he might become better acquainted with the country and people than he could by other modes of travelling. This idea was not carried out at the time; but on Mr. Burritt again visiting us in 1863, he took his long-deferred pedestrian journey. Believing, as he says, that many English people would be interested in the views of an American on English scenery, industries, and social life, he published the very pleasant book we have mentioned.

It will be understood, then, that Mr. Burritt walked from London to John o'Groat's, with no other encumbrance than a knapsack. "I hastened on to Newcastle-upon-Tyne," he writes, "in order to attend, for the first time in my life, the meetings of the British Association for the Advancement of Science. I reached that town on the 25th of August, and remained there a week, enjoying one of the greatest treats that ever came to my lot. I will reserve a brief description of it for a separate chapter at the end of this volume, if my notes on other matters do not crowd it out."

We are sorry to find that "notes on other matters" must have crowded out the opinions on Newcastle and its people that the author intended to give. Mr. Burritt left Newcastle on the 3rd of September, 1863, and proceeded next to Hexham. From this ancient town he faced northward, following the picturesque and romantic valley of North Tyne, studded with parks, castles, and baronial residences. Two more days' walking brought our tourist into the midst of a wild region, having all the solitary grandeur of "heather-haired hills," with only here and there a shepherd's cottage to be seen. "My walk," says Mr. Burritt, "now lay over the most inhospitable and unpeopled section I ever saw. Calling at a station on the railway that passes through it, I was told by the station-master that the nearest church or chapel was sixteen miles in one direction and over twenty in another. It is doubt-

ful if so large a churchless space could be found in Iowa or even Kansas."

Weary and worn-out, Mr. Burritt was very glad to reach Hawick, where he rested a couple of days. In noticing the staple trade of the district, he states that the fabric "Tweed" came by the name in a singular way. The clerk of the factory made out an invoice of the first lot to a London house under the name of *twilled* goods. The London man read it *Tweeds* instead of twilled, and ever since the stuff has gone by that title. The mistake turned out a lucrative one to the manufacturers of the article.

Mr. Burritt, during his stay in Newcastle, was the guest of the late Henry Richardson. B. B.

Notes on the Sword Dancers' Song and Interlude.

By John Stokoe.



ITH the advent of Christmas each year there comes a revival of some of the quaint and curious customs which marked the Yule Tide of our forefathers, and which are now only slowly dying out. The play or interlude of the Sword Dancers (or guizards), which is still exhibited at this season in the streets of towns on the Wear and Tyne, is of ancient origin, and has been practised and played in all parts of Great Britain, from Cornwall to the remotest islets of Shetland; and it is curious to find one play with unimportant variations preserved traditionally by the common people in parts of the island so distant from each other and in many respects so different.

Of the origin of this antique custom little is known. One antiquary (Wallis) thinks the Sword Dance is the Antic Dance or Chorus Armatus of the Romans. Brand supposes that it is a composition made up of the gleanings of several obsolete customs anciently followed in England and other countries. The Germans still practise the Sword Dance at Easter; and Sir Walter Scott gives an account of a similar play, in notes to his novel of "The Pirate," as performed in Shetland.

The performance in Northumberland and Durham is chiefly undertaken by pitmen, who, during the holidays, in parties of a dozen or more, each with a sword by his side, and clad in white shirts profusely decorated with ribbons of various colours, resort to the towns to perform this play, accompanied by song and music. The Captain of the band, who usually wears a cocked hat and peacock's feathers in it by way of cockade, is attended by a Clown, or Bessy, who acts as treasurer and collects the money.

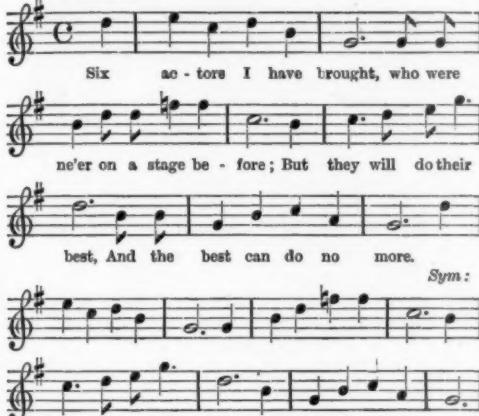
The Captain forms a circle, round which he walks;

the Bessy opens the proceedings by singing the first verse, the Captain following by introducing the various characters personified in singing the succeeding verses. The fiddler accompanies the song in unison with the voice, repeating the air at the end of each stanza, forming an interlude between the verses, during which the characters as introduced by the singer make their bow, walk round, and join the circle.

The Bessy chants :—

Good gentlemen, all, to our Captain take heed,
And hear what he's going for to sing ;
He's lived among music this forty long year,
And drunk of the elegant* spring.

Andantino.



The Captain then proceeds with the

SWORD DANCERS' SONG.

Six actors I have brought who were ne'er on a stage before,
But they will do their best, and the best can do no more.

The first that I call in, he is a squire's son ;
He's like to lose his sweetheart, because he is too young ;
Although he be too young, he has money for to rove,
And he will freely spend it all before he'll lose his love.

The next that I call in, he is a tailor fine ;
What think you of his work ? He made this coat of mine.
So comes good Master Snip his best respects to pay ;
He joins us in our trip to drive dull care away.

The next that I call in, he is a soldier bold ;
He's come to poverty by spending of his gold ;
But though he all has spent, again he'll plough the main,
With heart both light and brave, to fight both France and Spain.

Next comes a keelman bold ; he'll do his part right weel ;
A clever blade, I'm told, as ever puoyed a keel ;
He is a bonny lad, as you must understand ;
It's he can dance on deck, and you'll see him dance on land.

To join us in this play here comes a jolly dog
Who's sober all the day when he can get no grog ;
But though he likes his grog, as all his friends do say,
He always likes it best when he hes nowt to pay.

Last I come in myself, the leader of this crew,
And if you'd know my name, my name it is True Blue.

Here the Bessy gives an account of himself :—

My mother was burnt for a witch,
My father was hanged on a tree,
And it's because I'm a fool
There's nobody meddled wi' me.

The dance then commences. It is an ingenious performance, and the swords of the performers are placed in a variety of graceful positions so as to form stars, hearts, squares, circles, &c. The dance is so elaborate that the performers require frequent rehearsals, a quick eye, and a strict adherence to time and tune. Before it concludes the actors become disorderly, and are seen fighting. One character, who rushes in to make peace, receives his death blow, and is laid on the ground, while the others walk round singing the following verses in slow time :—

Alas ! our Parson's dead, and on the ground is laid ;
Some of us will suffer for't, young men, I'm sore afraid.
I'm sure 'twas none of me, I'm clear of that crime ;
'Twas him that follows me that drew his sword so fine.
I'm sure it was not me, I'm clear of the fact ;
'Twas him that follows me that did this dreadful act.

The Bessy sings :—

Cheer up, cheer up, my bonny lads, and be of courage brave ;
We'll take him to his church, and bury him in the grave.
Captain :—Oh ! for a doctor, a right good doctor—a ten pound doctor, oh !

Doctor :—Here am I.

Captain :—Doctor, what's your fee ?

Doctor :—Ten pounds is my fee ;
But nine pounds nineteen shillings and eleven-pence three farthings
Will I take from thee.

Doctor (sings) :—

See here—see here—a doctor rare,
Who travels much at home ;
Come, take my pills—they cure all ills,
Past, present, and to come.

The plague, the palsy, and the gout,
The devil within and the devil without—
Everything but a love-sick maid
And consumption in the pocket.

Take a little of my nif-naf,
Put it on your tif-taf ;
Parson, rise and fight again,
The doctor says you are not slain.

The Parson gradually recovers, which is the signal for general rejoicing and congratulation.

Captain (sings) :—

You've seen them all called in, you've seen them all go round,
Wait but a little time, some pastime will be found.

Coxgreen's bonny place, where water washes clean ;
And Painshaw's on a hill, where we have merry been.

Then, fiddler, change thy tune, play us a merry jig ;
Before I will be beat, I'll pawn both hat and wig.

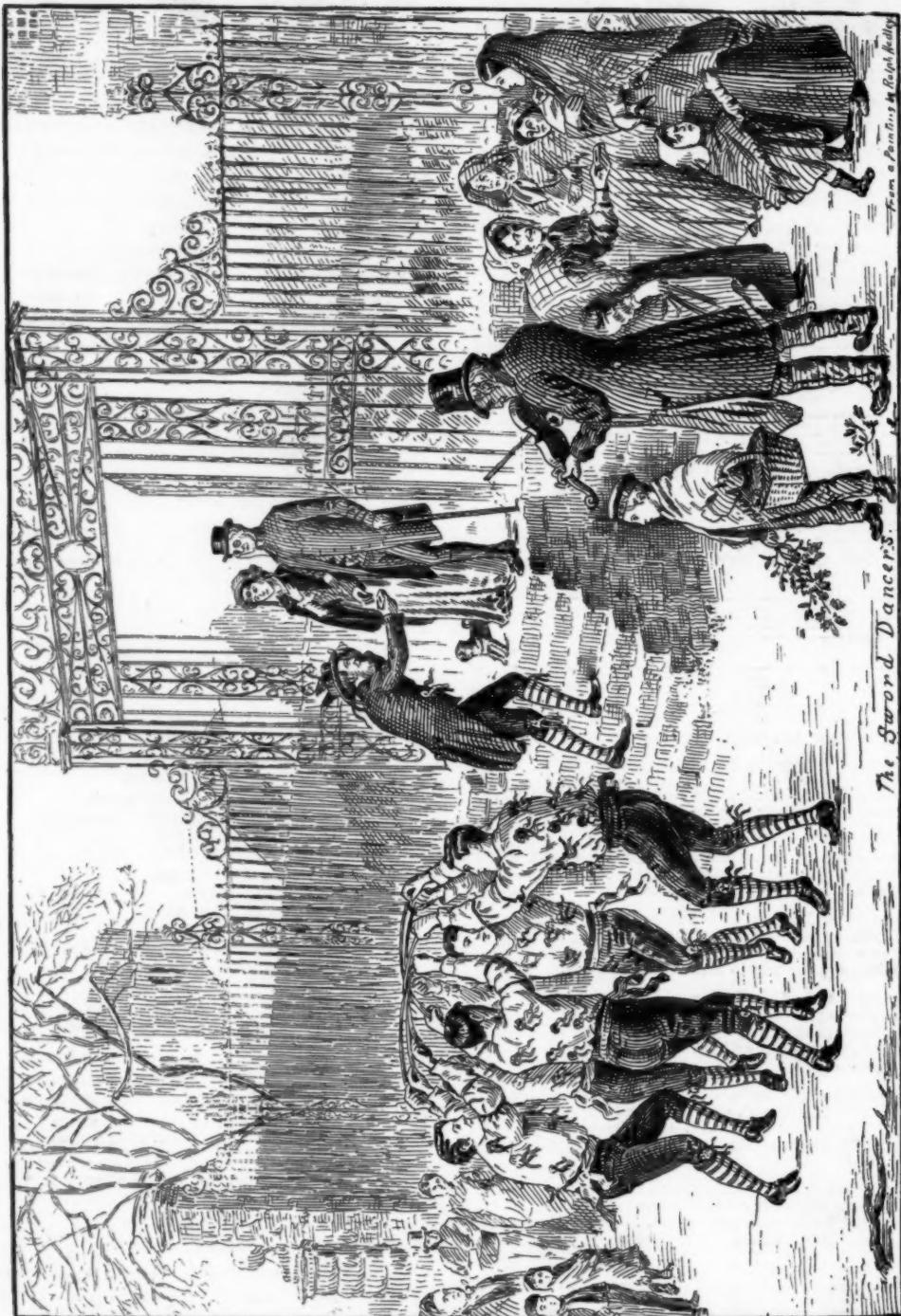
Our play is at an end, and now we'll taste your cheer,
We wish you a merry Christmas, and a happy New Year.

The Bessy—

And your pockets full of brass,
And your cellars full of beer.

The ceremony concludes with a general dance to the tune of "Kitty Bo-Bo." Our version is collated with Topliffe's and with that in Sir Cuthbert Sharp's "Bishoprick Garland," and the music is from the

* "Helicon," observes Sir Cuthbert Sharp, "is of course the true reading."

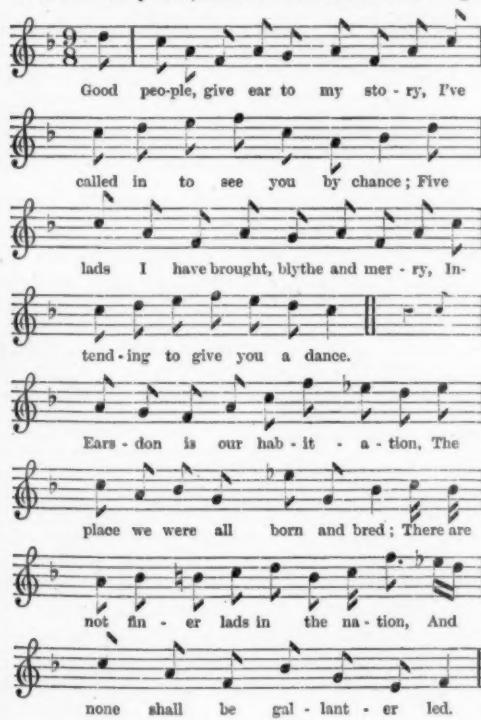


"Northumbrian Minstrelsy" published by the Newcastle Society of Antiquaries in 1882.

KITTY BO-BO.



The version given below is the one now commonly sung by the pitmen from Earsdon, who have for above thirty years been accustomed to visit Alnwick Castle at Christmas. The rhythm of the verses requires a different tune to the one anciently used, and is not incidental to the song.



Tis not for your gold or your silver,
Nor yet for the gain of your gear,
But we come just to take a week's pleasure,
To welcome the incoming year.
My lads they are all fit for action,
With spirits and courage so bold ;
They are born of a noble extraction,
Their fathers were heroes of old.

Now this is the son of brave Elliott,
The first youth that enters the ring ;
So proudly rejoice I to tell it,
He fought for his country and king.
When the Spaniards besieged Gibraltar,
Bold Elliott defended the place,
Soon caused them their plans for to alter ;
Some died—others fell in disgrace.

Now my next handsome youth that does enter
Is a boy there are very few such ;
His father beat that great De Winter,
And defeated the fleet of the Dutch.
His father was the great Lord Duncan,
Who played the Dutch ne'er such a prank,
That they from their harbours ran funk'in',
And they fled to the great Dogger Bank.

This one is the son of Lord Nelson,
That hero that fought at the Nile ;
Few men with such courage and talent,
The Frenchmen he did them beguile.
The Frenchmen they nearly decoyed him,
But the battle he managed so well,
In their fortress he wholly destroyed them,
Scarce one got off home for to tell.

Now my next handsome youth that does enter
Is a boy of ability bright ;
Five thousand gold guineas I'd venture
That he, like his father, would fight.
At Waterloo and Tarryvary,*
Lord Wellington made the French fly ;
You scarcely can find such another,
He'd conquer or else he would die.

Now my last handsome youth that does enter
Is a boy that is both straight and tall ;
He is the son of the great Buonaparte,
The hero that cracked the whole all.
He went over the Lowlands like thunder,
Made nations to quiver and quake ;
Many thousands stood gazing in wonder
At the havoc he always did make.

Now you see all my five noble heroes,
My five noble heroes by birth,
And they each bear as good a character
As any five heroes on earth ;
If they be as good as their fathers,
Their deeds are deserving records.
It is all the whole company desires,
To see how they handle their swords.

The Sword Dance then follows as in the older version, usually to a tune in 6-8 time, selected from the fiddler's repository.

The sketch which accompanies this article is copied by the kind permission of the artist from Mr. Ralph Hedley's picture of "The Sword Dancers." Here we see the performers going through their evolutions in the snow outside the Rector's gates at Tanfield, while the Captain pays his respects to the rector, and the Bessy solicits patronage from the onlookers.

* Query: Torres Vedras.

The Cotton-Ball Duel.

THE following skittish poem was the work of William Chappel, who wrote under the *nom-de-plume* of Peter Flint, and who was born at Houghton-le-Spring, though he resided for many years in the neighbourhood of Sunderland. The occurrence to which allusion is made in the rhyme took place on May 14, 1842. The parties to the duel were Richard Spoor, of Whitburn, a retired draper and grocer, and Joseph Wright, a well-known Sunderland solicitor. The "old Booth," mentioned by Peter Flint, was Richard Booth, a gunsmith, whose shop was near the Exchange. "Sir Murdey" is intended to indicate William Murdey, surgeon, who resided in John Street, opposite the Post Office. The author makes reference to "old Snuff, of Diamond Hall"; for Snuff, read Snowdon. "Sir Miller" was Dr. Miller; "St. George, the noble Bum," George Whitfield, bailiff; and "Marlborough," John Marlborough, mattress-maker, and a well-known local vocalist.

ST. JOHN CROOKES, London.

CANTO I.
Now, lythe and listen, gentlemen,
A tale to you I'll tell.
The battle of the Tory knights
At Marsden Rock befall.

Sir Rich'd de Spurr, of Whitburn
Town,
A challenge sent to Joe,
Saying, "Coward, meet me on
the rock,
Or on the sand below!"

"Why did you tell Lord Derry-
down
That I was half-and-half?
I am a faithful Tory Knight—
You're but a legal calf!"

"Now, I demand, Sir Joe de
Wright,
Submission from your hand,
Or from old Booth hair-triggers
get:
Your blood shall stain the
sand!"

Sir Joe, he sent the challenge
back;
"I'll make Sir Richard run!
I'll meet him in the mountain
glen,
With pistol, pike, or gun;

"I'll make him tremble every
limb,
I am no sneaking cur;
I'll soon blow off the curly head
Of great Sir Rich. de Spurr!
"Go, get a scribe to make his will,
His days are nearly o'er—
This day I'll slay Sir Dick de
Spurr;
His blood will stain the shore!"

CANTO II.
"Twas on a lovely May-day morn,
The lark was mounting high,
Sir Richard pulled his nightcap
off,
And wiped his tearful eye.
He kissed his children o'er and
o'er,
With many a heavy sob:
"No bard shall write my epitaph—
This is an awful job!"

"Cheer up, my friend," Sir
Murdey cries,
"I've Eucalyptian skill
To drown the pups and bring to
life;
And save thee, sure I will."

Sir Richard grasped the Doctor's
hand,
His heart was beating sore:
"Oh! use thy great galvanic
skill,
I'll pay thee o'er and o'er."

Out spoke the hardy Railway
Knight,
"Before the sun goes down,
Sir Richard sends his pistol ball
All through Sir Joseph's
crown!"

"Yea; thou hast dined with
England's Queen,
And lords of high renown;
Go! and defend thy country now,
The altar, state, and crown."

"I will, I will!" Sir Richard
cried,
"I am resolved to fight!
This very day, I sure will slay
The great Sir Joe de Wright!"

CANTO III.
"Twas even-tide, the stars shone
bright,
And all was calm and still;
Sir Joe de Wright he wander'd
forth,
And stood on Boyling Hill.

Hegazed upon the glorious scene,
Now slumbering in repose,
And from his pouch a kerchief
drew,
And then he blew his nose.

With martial strides he marched
along,
And wrapp'd his cloak around;
"And am I doomed to die?" he
cried,
"To-morn by pistol wound;

"No! I will like a hero stand!
I'll rather die than yield—
I've stood 'mongst thousand
British hearts
That met at the Pan-Field.

"Twas there I spoke in patriot
strains,
That all men should be free;
I said that liberty would sound
O'er every land and sea.

"This cursed gold! It changed
my tongue,
But never changed my heart;
With slaughtered babes and
famed Job Swales,
I played a Tory part.

"I hate the foolish Tory crew—
Old Pestle, Potts, and all;
There's one who pesters out my
life,
Old Snuff, of Diamond Hall.

"I hate the spiteful Whiggish
beaks
(They Judas called my name);
I'll now go to the people's ranks,
And gain a Patriot's fame!"

CANTO IV.
In musing mood Sir Miller sat,
All lone in Bachelor Hall,
Arrayed in morning gown and wig
When lo! on him did call

Sir Crawford, who, with railway
speed,
Then laid a paper down.
Sir Miller stared; Sir Crawford
wheel'd,
And left him with a frown.

All tremblingly Sir Miller took
The paper in his hand:
"Sir Joe he shall Sir Richard meet,
This morn on Marsden sand!"

Sir Miller a prescription wrote
All for a lady fair,
But, in mistake, the challenge
sent.
The lady tore her hair.

She rushed into a balcony,
The milk-white hands did
wring:

"O, woe is me! My love is gone;
This day his will bring;
To stay the bloody deed!"

"Go! bring St. George, that
noble Bum,

Tell him to come with speed;

And mount him on an Arab steed

To stay the bloody deed!"

Sir George he came, with his
brown wig,

And gold ring on his hand.

With tears the lady cried, "Sir
Bum,

Go, ride unto the sand!"

She said, "A thousand pounds
I'll give,

If thou my love wilt save;

I would not lose, for all the
world,

My beautiful—my brave!"

"I'll save my master!" cried St.
George,

"I'll save him, now, this day;
Dick Chilton! go, get me a horse,
And I will ride away."

Sir George and Chilton onward
went

To Marlborough's yard along;
"Bring out thy and brown boy,"
said Dick,

"Thou noble son of song!"

Sir George, he mounted on his
steed,
And with his cane did thresh.

Said Dick, "Your horse is high
of bone,

And rather low of flesh."

Away! Away! St. George, the
Bum,
On winged Pegasus rode;

He'll point you out the battle-
field,

And show the COTTON-BALL!

He halted soon at Merriman's,
And then drew out his purse;
"Some whiskey, here!" A bumpkin
grinned:

"Oh! maister! What a horse!"

Onward still, St. George he rode,
The villages to raise;
He soon o'ertook Sir Joe de
Wright,

And stopp'd him in his chaise.

Sir Joseph found, St. George did
say:

"What's all this work about!
Don't fight to-day, but runaway,

Your mother knows you're
out!"

Sir Richard here was passing
by—

Sir Crawford's eyes did roll;
He cried, "If Whitfield stops
Sir Joe,

We'll fight at the North Pole!"

Sir Miller cried, "St. George,
the Bum!
Now, get thee home I pray,
We've plasters, lint, and bandages—

Sir Joe they ne'er can slay!"

CANTO V.
Adown the glen rode armed men,
Sir Miller scratched his wig;
Sir Joseph rode within his chaise,
Sir Richard in his gig.

They landed by the battle plain,
Beside the beating surf,
With Peter Allan from his cave,
Jack Winter from the Turf.

Sir Murdey is a glorious wag,
In cottage or in hall;
And to himself he said, "I'll
load
Their arms with cotton-ball."

He called Sir Miller to his side—
A Tory of renown—
And, knowing he was deaf and
blind,
He ramm'd the cotton down.

And, at ten paces distant, there
These noble warriors stood;
And each was quivering every
limb,
To shed each other's blood.

They took the pistols in their
hands,
And turned them back to
back;

"Now, fire!" was given; Sir
Richard wheeled,
And fired off in a crack.

Sir Joe stood like a monument,
With fear, do declare,
And when his senses came again
He fired into the air.

Sir Richard's bullet, it was
found,
Near Peter Allan's ass;
And Peter's got it now pre-
served
Within a spirit-glass.

Sir Joseph's ball, it soared away
Among the stars aboon;
They've seen 't through Her-
schel's telescope,
Now sticking in the moon!

These warriors all went home
again
As wise as ere they came.
So all the knights got roaring
full
Of wine and mighty fame.

Now when you go to Marsden
Rock,
On Peter Allan call;
He'll point you out the battle-
field,
And show the COTTON-BALL!

Cobbett in the North.

SYKES, whose Local Records close with the month of October, 1832, does not devote a single line to the visit to Newcastle in the preceding month of that celebrated politician, William Cobbett.

Cobbett, who was a few months afterwards elected member for Oldham, left Bolton on the 18th of September, 1832, and travelled, the first day, through Bury and Rochdale, to Todmorden. All next day he stayed at the latter place to write and to sleep; and the day after that he set off for Leeds by the stage-coach, through Halifax and Bradford. He got to Leeds about four o'clock, and "went to bed at eight precisely." At five on the morning of the 21st, he came by coach to Newcastle, through Harrogate, Ripon, Darlington, and Durham. Early next forenoon (Saturday), a deputation of gentlemen, with Mr. Charles Larkin, surgeon, at their head, waited upon him with an address, printed on white satin, which was put into his hands in due form, and which, says he, in his account of his tour, "I received with greater pride than I ever received anything in my life." Mr. Larkin's speech on this occasion was as follows:—

I am deputed by the gentlemen who have signed this address—an address of congratulation on your arrival in this town—to present it to you. To me this is an office which I perform with sentiments of pride and gratification which language is inadequate to express; and I embrace with eagerness the opportunity it affords of acknowledging the deep debt of gratitude which, as a Catholic, I owe to the Historian of the Protestant Reformation. Sir, you conclude your English Grammar with the following sentence of advice to your son:—"Never esteem men merely on account of their riches or their station. Respect goodness, find it where you may. Honour talent wherever you behold it unassociated with vice; but honour it most when accompanied with exertion, and especially when exerted in the cause of truth and justice; and, above all things, hold it in honour when it steps forward to protect defenceless innocence against the attacks of powerful guilt." We, sir, on this occasion, are actuated precisely by the sentiments you have so well expressed in these beautiful lines. In you we honour talent not only unassociated with vice, but attended with great virtues; not only attended with great virtues, but accompanied with great exertions; not only accompanied with great exertions, but with exertions that have uniformly been in the cause of truth and justice; and, above all things, we honour you because you have never failed to step forward to protect defenceless innocence against powerful guilt. To us it is peculiarly pleasing to have this opportunity of laying before you our unaffected sentiments of admiration and esteem, because in addressing you we cannot be suspected of flattery nor accused of hypocrisy. You, sir, have not riches, nor places, nor pensions, nor honours, nor stars, nor ribands, nor garters, at your disposal: what motive, then, can we have in presenting an address to you but that of giving expression to our feelings in the simplicity and sincerity of our hearts? You have made, not only individuals, but a nation your debtor. There is not one of us who has not personally experienced the advantages of your exertions. In your admirable grammars of the French and English languages, what useful instruction and how pleasingly conveyed! In your "Advice to Young Men," what excellent lessons and what incentives to virtue and independence! In your agricultural works, what know-

ledge of rural affairs! In your "Cottage Economy," what knowledge of domestic concerns! In your *Political Register*, what knowledge of the economy of nations! In these works what a versatility and variety of talent do we behold—what evidence of mind at once comprehensive and minute in its views, embracing things of vast and gigantic magnitude, and not disdaining those that appear little and unimportant! We are proud of you as our countryman, and regard with admiration a genius that has elevated you from the guidance of the plough to fitness to guide a kingdom.

The address, after adverting to the great utility as well as unrivalled talent of Mr. Cobbett's writings, "especially regarding them as directed to better the condition and improve the minds of the labouring class—that class which, if honours were rightly distributed, ought to be held the highest, as all the rest depend upon it," went on to speak of his strictures upon the then much agitated paper money *versus* gold currency question. "In your views on this most momentous matter," it said, "you have, in our opinion, been right from first to last, and so deeply and thoroughly convinced are we of the truth of your doctrines, that we embrace the opportunity of declaring that on one essential point we will take your advice. We declare, sir (and your reasonings are the cause of the declaration), that if any alteration in the currency be attempted, every one of us who have moneys either lodged in savings banks or otherwise similarly invested, will, on hearing of such attempt, immediately turn such money into gold, and keep it so." Mr. Cobbett was further congratulated on the passing of the Reform Bill, inasmuch as it would inevitably bring about, in the fulness of time, the success of those great measures of which he, during a long life, had been the most able and most unwearied advocate. "We have no doubt," said the addressers, "that your admission into Parliament will be one of the consequences of that bill, and we shall esteem your advocacy in Parliament of those great measures which you have so long advocated out of it as the surest evidence that the reform, which we have hailed as real is real indeed." Finally, they said:—"We wish you, sir, health and happiness, and that you may have the perfect felicity of witnessing, and carrying into effect, that full consummation of national regeneration, to the success of which you have been, by your writings, in our opinion, the greatest contributor."

Appended to the address were 682 signatures of persons, mostly shopkeepers, who seemingly all belonged to Newcastle, except two, viz., Luke Haslam, of Widdrington, where he was a schoolmaster, and Henry Hart, who hailed from Hexham, where he carried on business in the Market Place as a wool-comber and worsted manufacturer. Foremost on the list are the names of Thomas Doubleday, the author of "The True Law of Population," and other works; Thomas Jonathan Wooler, editor of the *Black Dwarf*; Eneas Mackenzie, son of the editor of the popular histories of Newcastle, Northumberland, and Durham; and Charles Larkin,

whose speech we have quoted. Among the subscribers were Thomas Gee, town surveyor; William Garrett, bookseller; William Hymers, ironfounder; Isaac Tucker, licensed victualler; John Ramsay, M.D.; the Rev. William Beattie Smith, United Secession minister; Thomas Barkas, painter and glazier; Thomas Waters, engine builder; and John Eldridge Wilkinson, superintendent of Westgate Lunatic Asylum.

The day after receiving this address, Mr. Cobbett went down to Shields. He was astonished as he passed along at the stir and bustle he observed on the banks and on the river; such as, says he, never was seen, except at London itself. Newcastle, North Shields, Gateshead, and South Shields seemed to him to be the exact counterparts of London, Wapping, Southwark, and Deptford; for "all these are so precisely like the big thing in Middlesex and Surrey that it would almost make one believe that the former place had bred, and that this was a young one." He has a hard hit in one of his letters at the old unreformed Corporation of Newcastle, with its Mansion House and its profligate expenditure of the public money on private purposes. He next visited Sunderland, with its main street, "a mile and three-quarters long," and admired its "innumerable shops, finer, on the average, than those of the Strand, Fleet Street, and Cheapside." Burdon's famous iron bridge, stretching from shore to shore in one gigantic arch, of course called forth his wonder, as well it might, seeing that at that time it was unequalled in the world as an engineering triumph. But "the most interesting and valuable products in this part of the country" he deemed to be the people, of whom it was "impossible to speak too much in praise." From Sunderland, where also he received an address, signed by 87 inhabitants, including Sir Cuthbert Sharp, James Dunn, John Kidson, John Lindsay, Thomas Reed, Thomas Rippon, Thomas Robson, and other well-known gentlemen, Cobbett went to Durham, making pertinent remarks by the way on the collieries. He lectured in all the five large towns on the Tyne and Wear to crowded audiences, finishing off with Newcastle, where he was presented with a copy of Mackenzie's "History of Newcastle," elegantly bound in morocco, in presence of an audience of nearly nine hundred persons, "among whom were many, of both sexes, of the first figure in the town"—Mr. Doubleday being the spokesman. From Newcastle he went north to Morpeth, thence west to Hexham, afterwards back to Shields and Sunderland. At Tynemouth, the address presented to him contained no fewer than 855 names, among which figure those of John Carr, J. A. Drury, William Hansel, Thomas Haswell, Dennis Hill, John Peacock, Robert Pow, John R. Proctor, &c., all men of local mark and consequence. From Alnwick, to which the tourist next proceeded, he went forward to Belford, and thence to Berwick, where he arrived on the eve of a fast-day,

and therefore hurried away from it. And so on past Ayton, Cockburnspath, Dunbar, and Haddington, to Edinburgh, the headquarters, as he dubs it, of the "pestiferous Scotch feelosophers."

The *Newcastle Chronicle* of September 29, 1832, and subsequent dates, gives particulars of Mr. Cobbett's visit. "On Friday, the 21st inst.," says the report, "Mr. Cobbett arrived in this town, and on the following day a hand-bill was issued announcing Mr. C.'s intention of giving two lectures at the Theatre (Mosley Street) on the present state and prospects of the country. A numerous and respectable audience accordingly assembled at the Theatre on Saturday evening, and after some delay Mr. Cobbett appeared, and was received with great applause." Referring at the outset to the



William Cobbett.

Reform Bills, and the effects which they were likely to bring about, he advised that in the choice of proper representatives the people should not select any who had been in Parliament before. He remarked:—"It was said that they must choose gentlemen, men of rank, station, and family, or, as the unprincipled, profligate, and bloody Castlereagh called it, the 'education' of the country. The people had done that already, and what had been the result? He would say now, try the 'ignorance' of the country, for he was sure they could not be worse than their predecessors." Proceeding to matters of detail, Cobbett spoke as follows:—"Our new representatives must pledge themselves to do all in their power to take off the taxes and abolish tithes both in England and Ireland. The Corn Bill must be utterly

abolished, and the stamp taxes taken off. If they took off the taxes and abolished the tithes, there would be no occasion for the Corn Bill at all; the land would be better tilled, and we should hear no more of fires. The pension list should be reformed. Then there was the expense of the standing army. There was no standing army in America, and there ought to be none here. The standing army was no use but for the collection of the taxes, and the taxes ought to be taken off. He would allow the king forty times as much as the President of America gets; and the queen should have a thousand times as much as the President's wife, for she got nothing." The second lecture was chiefly devoted to the defence of the proposed abolition of tithes. Mr. Cobbett maintained that tithes were not for the purpose of religion, and expressed his opinion that the clergy were "a very hypocritical and profligate" set of men. "He was satisfied, he declared, that the remedies he had advocated were for the honour of the Church and the harmony and tranquillity of the country; and if he had the power to attempt them he would, so help him God!" Being then exhausted, the lecturer deferred some remarks which he had intended to make upon the National Debt until the subsequent Friday—Sept. 28. That day he put before the meeting his views on the question, as they had been stated in his *Register* twenty-nine years previously. Alluding to the proposal of Sir James Graham, in 1827, to take off a third of the debt, he contended that, if it was right to take off a third, it could not be very far wrong to take off the whole amount. He maintained that, if ever there was a debt, it had been long since paid off, together with interest upon interest. Cobbett's fourth and final lecture in Newcastle was delivered on October 5.

Cuddy Alder's Goose Pies.

A STRIKE of keelmen occurred on the Tyne in March, 1709. After it had lasted a short while, and long before it ended, the unemployed people found themselves hard put to it for bread and cheese; for there was no trades union to assist them in those days, and they were not individually much more provident then than folks in a similar station are now.

It happened that a certain kind old gentleman, named Cuthbert Alder, who resided near Long Benton, had laid up for Christmas a plentiful store of toothsome viands and dainty dishes, particularly goose-pies. Some of the keelmen had already begun to thieve in a small way, and a gang of them, who had got to know what goods the gods had provided for Mr. Alder's family and friends against the forthcoming festive season, fixed on that gentleman's larder as a likely prize. They accordingly one night attacked the house, which was in a secluded situ-

ation at Low Weetslade, when something in the shape of a battle ensued. The first enemy they met was overthrown without difficulty, being nothing more formidable than a company of working tailors, who were lodging at the time with the lord of the mansion, engaged in making old clothes look as good as new. Mr. Alder had thus to meet the robbers alone; but he was, before many seconds had elapsed, ably seconded by an Amazonian servant. This woman proved a valiant ally, dealing about her so stoutly as to draw upon herself the main violence of the attacks, until she was compelled to retire from the scene with a broken arm.

The owner of the goose-pies might now have been slain, for the keelmen were exasperated by his long-protracted defence; but he was saved through the awakened conscience of one of the assaulting party, who had experienced some kindness at his hands on a former occasion, and who felt that the work in which he was engaged was something like black ingratitude. This man, therefore, now interposed to save Mr. Alder's life. He had—the more shame to him—previously pointed out a short and easy way to the larder, which his comrades soon effectually cleared of its contents; and no doubt, repentant sinner though he was, "He shared in the plunder, but pitied the man." And so the robbers managed to clear off with their savoury booty before the hinds and other male servants, who were asleep in a detached outhouse, were awakened.

Vigorous efforts were of course made to find out who the plunderers were, but for some time rewards for their apprehension were all in vain. When all other detective agents had failed, however, Mr. Alder himself, at a lucky hour, came upon a clue. He received some change in silver one day at a shop on Newcastle Quay, and one of the coins particularly attracted his notice. From a private mark upon it, or some other peculiarity, he recognised it as having been part of the property stolen from his house. Questioning the shopkeeper as to whom he had got it from, he soon found out the person in whose possession it had last been. This led to fresh discoveries, the result of which was that the whole set of predators were by-and-by found out, severally apprehended, arraigned, tried, and found guilty of burglary with personal violence; and in due course two of the ringleaders were hanged upon a gallows erected on purpose on Newcastle Town Moor, where none had been executed for thirty years before.

Mr. Alder had now a right to the money which had been offered for the detection of the burglars; but, a noble sense of delicacy determining him not to keep it, he gave the whole amount to the poor. This was done by buying about four acres of land, known as Dacre's Close, situate in the township of Murton and parish of Tynemouth, and devising the close by will, dated 23rd May, 1736, to the vicar and churchwardens of Long Benton for the use of the poor of that parish. Mr. Alder died in 1736, at the

venerable age of 88; and his mortal remains were deposited on the west side of the porch of Long Benton Church, where his monument is still to be seen.

The siege of the Low Weetslade larder was long the subject of a joke amongst the Newcastle keelmen. Soon after the midnight raid the force of the joke was increased by the outcome of another robbery. In the early spring of 1710, many of the Tyneside farmers missed their lambs, which disappeared so mysteriously and hopelessly that the owners began to look at one another in astonishment, as if there was some witchcraft in the wind. After a time, however, one of them, while crossing a field beside the river, caught sight of a set of keels floating down towards the sea. Suddenly he heard the bleating of a lamb, and found to his astonishment that it came from the keels. Getting together what he deemed a sufficient force, he boarded the tiny fleet. And there, sure enough, in the haddock of one of the keels, was a live lamb, affording presumptive proof that the keelmen had been in the habit of adding to their ordinary occupation that of purveyors of their own live provisions. The thieves, we are told, were punished in due process of law; and a strict watch was afterwards kept, so that the keelmen had no favourable opportunity of indulging their lawless appetite at other people's expense. Moreover, the rigour of the law was succeeded by the lash of the tongue, and saucy taunts and sarcasms, gibes and jeers, about goose pies and spring lambs were, for a couple of generations at least, constantly cast in the teeth of the burly keel bullies. "Hoo did ye like Cuddy Alder's gyuse pies?" and "Hev ye onny lamb iv yor haddock?" were questions which were the fell cause of many a fight between watermen and landsmen for years after the occurrence of the last of the depredations which gave rise to them. "Sometimes," says Mr. Richardson, who compiled his version of the story in the "Local Historian's Table Book" from communications sent him by various residents of Weetslade, "the keelmen were driven, amid the jeers and laughter of the idle bystanders, to hide their diminished heads in the deep recesses of a haddock. But more frequently the keelman, if he had any number of his brethren at hand to back him, was not slow in putting to silence the curiosity of inquirers by a sound thrashing."

A Tale of the Press Gang.



HE following quotation records an incident connected with the days of the press gang:—
"In April, 1804, while the kidnapping was being actively carried on, a young seaman named Stoddart jumped into the Tyne, to escape from the press gang, who had hunted him down the Broad Chare, Newcastle, and attempted to swim across to Gateshead. But, one of the gang threatening to fire at him

if he did not return, he lost his presence of mind, and, becoming quite powerless, sank, and was drowned. We do not know whether an inquest was held on the body, but, if there was, the coroner would most likely instruct the jury to return a verdict of 'Accidentally drowned.'"
G. J. NAGOL, Heaton Junction.

The Bewcastle Cross.



EVERAL examples of runic memorials exist in this country. The most famous in the North of England is the pillar or cross at Bewcastle, near Brampton and Carlisle. I have frequently visited it during my summer holidays in North Cumberland. The figures on the cross, apart from the so-called runes, remind me much of those of the Ruthwell (pronounced Rivall) Cross in Dumfriesshire, the pleated figures, if they may be so called, on the Runic Crosses in Whalley and Winwick churchyards, Lancashire, and that in Kirk Braddan churchyard, Isle of Man. A late rector of Bewcastle, the Rev. John Maughan, A.B., published in 1857 a most learned and interesting "Memoir of the Roman Station and Runic Cross at Bewcastle." From this brochure,* it seems that the cross was taken down (it must have been subsequently returned and restored) by the famous Belted Will Howard, a zealous antiquary and scholar, according to his lights and time. It (the cross, it is to be presumed) was sent by Belted Will to his relative, Lord Arundel, by whom it was transferred to Camden, the learned author of the "Britannica." A copy of the inscription on the cross was forwarded by Sir Henry Spelman to one of the earliest runic scholars, Olaus Wormius, who read it as "probably signifying the monument, or cross, or sign of a mighty lord."

Though various readings on the Bewcastle Cross, or Pillar, have been given, it is now generally conceded by runic experts that the Bewcastle Memorial was erected over the body of Alfrid, or Alcfrid, who probably became King of Deira about the year 650, when his father Oswy (King of Northumbria) slew Oswin, who was at that time King of the province of Deira. The late rector of Bewcastle (Mr. Maughan), whose residence on the spot gave him great facilities for studying the inscriptions on the pillar, thus translates the runes into four alliterative couplets, the peculiar feature of Anglo-Saxon poetry:—
"Hwætred, Wæthgar, and Alwfrool erected this slender pillar in memory of Alcfrid, one King, and son of Oswy. Pray for them, their sins, their souls." Another reading, more favoured by archaeologists, is given by the Rev. H. D. Haigh, of Erdington, near Birmingham, in a

* An old gentleman, who printed the book at Carlisle, informs us that Mr. Maughan engraved all the drawings for it himself, with no better instruments than his own penknife.

paper on the subject printed in the "Archæologia Eliana"—a gentleman reported to be well skilled in Anglo-Saxon dialects and idioms. It must, however, be recollect that the last-named gentleman, according to the statement made by the rector of Bewcastle, only cursorily examined the pillar, and that his reading is given from imperfect rubbings. Mr. Haigh also reads the runes in alliterative couplets:—"This beacon of honour set Hwætred, in the year of the great pestilence, after the ruler, after King Alcfrid. Pray for their souls." Mr. Maughan, while elaborately setting forth his objections to the above translation, observes:—"A very interesting question arises whether this Bewcastle specimen of Anglo-Saxon poetry is not the oldest on record, being nearly 1200 years old. My own impression is that no earlier example has been discovered. This circumstance considerably enhances the value and importance of this ancient cross."

Bewcastle, once a Roman station, afterwards, it is believed, a Saxon royal residence, and subsequently a stronghold to keep in check the Liddesdale moss-troopers, is one of the wildest and most secluded districts on the Cumbrian Border. The modern church and the ruins of the Border peel—in the old fighting days the uneasy residence of the Captain of Bewcastle—stand on the site of the Roman station, which has been explored and described by the late Mr. Maughan. Many Roman inscriptions have been found here, as well as coins, jewellery, and other objects. About the year 1845, a gold ring set with brilliants was found in the garden of the manor house, and came into possession of a farmer's daughter. When I last visited Bewcastle, a few years ago, the runes and the curious floral or lingual decorations could be fairly well traced. The cross is a square, weathered stone, about fourteen feet in height, tapering towards the top. "This pillar," says Mr. Maughan in a foot-note, "which may be properly classed among the most celebrated of archæological monuments, is nearly the frustum of a square pyramid, measuring 22 inches by 21 at the base, and tapering to fourteen inches by thirteen at the top of the shaft, being fourteen and a half feet high above its pedestal. The pillar has been fixed with lead in a shallow cavity, which has been cut on the crown of a nearly cubical block of stone four feet square, and three feet nine inches high, which stone is now sunk three feet into the ground, and has been tooled off at the upper corners so as to assume the appearance of an unequal-sided octagon. On the top of the pillar was formerly placed a small cross, which has been lost for a considerable period; and hence the pillar is now merely an obelisk. The traditions of the district say that a king was buried here, and also point out the locality where the shaft of the pillar was procured; and the traditions are probably correct in both respects."

HENRY KERR.

Mr. Rd. Oliver Heslop, in the course of a series of elaborate articles he is contributing to the *Newcastle Weekly Chronicle*, states that the inscriptions on the Bewcastle and Ruthwell Crosses "give us undoubted examples of the writing which was in use amongst the Northumbrian Angles of the seventh century, which had been used by them for centuries before, but which were on the eve of being superseded by the Roman alphabet, introduced by Christian missionaries." The long inscription on the Bewcastle Cross begins thus:—

THI HIX BMXN
 THIS SIG BE CUN
 HMTTF HPTFRMH
 SETTE HWETRED
 SM XFR HPPMTHD
 EOM GÆR FLWOLDU
 HFTFR BFRF
 AFT ER BARE
 AMB HATIX
 YMD CYNING
 F. X. PRINCE
 ALC FRIDE
 X. X. MX. FH
 GICE GÆD
 NMHMHN YFRIN
 HEOSUM SAWLUM

Mr. Heslop prefers the following translation:—"This beacon of honour Set Hwætred In the year of the great pestilence After the ruler After King Alcfrid Pray for their souls." The interlined Roman letters are, of course, added to the above as a key to the runes.

EDITOR.



BEWCastle CROSS.

Highest Habitations in Great Britain.

KN Kirkstone Pass, a public-house, bearing on its sign an inscription stating it to be "The Highest Inhabited House in England," instances one of the many frauds practised upon tourists. The enterprising publican who first hit upon the expedient of calling his house by this lofty title lived before the days of ordnance maps. In the "Transactions of the Northumberland and Durham Natural History Society," new series, vol. ii., page 94, Mr. George Tate, F.G.S., in his "Physical Geography of Northumberland and Durham," says:—"At the head of West Allendale there is a village of perhaps thirty houses, called Coal Cleugh, at a height of from 1,600 to 1,700

and nearly two hundred feet above the height given of the Scottish mining village of Leadhills. The village of Coal Cleugh clings to the side of the valley through which runs the West Allen, and slopes upward from its lower end at 1,600 to its highest point at 1,700 feet. Its mean height, therefore, may be said to be 1,650 feet above sea level.

PETER PIPER, Newcastle.

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According to "Picturesque Europe," the inn at the highest point of Kirkstone Pass is situated at an elevation of 1,481 feet. But the highest house in Great Britain is stated to be Carour House, in Perthshire—1,740 feet above sea level. Both these places, however, must yield the palm to two houses between Nenthead and Garrigill in the parish of Alston—namely, Fairview and Priorsdale. Priorsdale stands at a marked elevation of 1,766 ft. 6 in. above sea level. I am unable to give the *exact* height of Fairview; but as a point on the road leading to it, and



KIRKSTONE PASS INN.

feet above sea level." In a foot-note he protests thus: "We may remark, in passing, that an idea which we found generally diffused, even amongst educated people, that the little inn at the top of Kirkstone Pass is the highest inhabited house in England, is quite incorrect. The height of this is 1,473 feet, and there are dozens of houses higher through the east side of the North of England." It is specially worthy of note that we have in the south-west corner of Northumberland a whole village which stands some two hundred feet nearer heaven than the Kirkstone inn, two hundred to three hundred and forty feet higher than the mining office at Allenheads (which is 1,360 feet above sea level),

apparently on a level with the house, is marked on the Ordnance plans as 1,882 feet above sea level, one may take this to be the elevation, thus placing it more than 400 feet above the house in Kirkstone Pass, and 142 feet above Carour House. There are several other houses near Nenthead situated over 1,500 feet above the sea level and so also above Kirkstone Pass. I may instance several houses at Dykeheads, and also Hardedge, the latter over 1,750 feet. Nearer Alston we have Foreshill Grains and Blagill Head, both over the 1,500 feet line, and there may be others. I have never heard it stated that Alston is the highest market town in England. It ranges in elevation from 900 feet

at the foot of the town to 1,061 feet at the town head, the Market Cross standing at an elevation of 963 feet above sea level. I may state that the heights I have given are all (with the exception of Kirkstone Pass) taken from the plans of the Ordnance Survey.

JOSEPH DICKINSON, Jun., Alston.

The Helm Wind.

AN interesting note on the Crossfell Helm Wind has been supplied to the Science Gossip of the *Newcastle Weekly Chronicle* by J. J. E., a correspondent at Slapewath. This singular natural phenomenon has given rise to a good deal of speculation as to its cause. The writer, who was brought up in the Crossfell part of Cumberland, describes the approach of the wind like as the roaring of the sea in a storm, and mentions a current statement that it never crosses the river Eden. The Helm forms upon the brow of the mountain, extending from the summit of Crossfell to the right and left, and generally as far as the range of the mountain is of any considerable height. Though occasionally more confined in area, the highest part of Crossfell is invariably the centre of the Helm, which can be observed at the summit of the mountain in clear and well-defined form, and has at twilight an imposing and majestic appearance. The Helm appears at different seasons of the year, and is entirely independent of eastern winds or any other regular currents. It is generally accompanied by what is known as the Helm Bar, a cloud which is formed in the air parallel to the wind itself. Beyond this bar the wind rarely extends, being met there by an opposing current of wind from the west; but on rare occasions when there is no bar the wind travels further across the country, where it gradually loses its velocity and force, and, mixing with contrary currents, assumes an erratic and undecided course. The most reasonable explanation of this peculiar phenomenon is that the wind is generated by the attraction of the mountains, the vapours being condensed along the summit. This condensation may be witnessed frequently upon the summits of Skiddaw, Scawfell, Helvellyn, Saddleback, and others; but these do not form one unbroken chain, and therefore are less favourable for the purpose than Crossfell. The atmosphere from its elasticity is capable of great compression—a fact which is apparent to all who have ascended to any great height, where the air is always lighter and more buoyant than that at a low level. But the density of the air is not always the same, heat causing it to expand and cold to contract. The earth itself being one of the principal causes of heat, the air in the valleys or at the foot of a mountain will be warmer and more expanded than that at the top, and the wind which forms the Helm, on being separated from the water, becomes contracted by the cold. Being heavier than the atmosphere below,

which has been rarefied by the heat of the earth, it rushes violently down the declivity of the mountain, becoming more and more expanded in its downward course. Having commenced its overwhelming career, the wind rages into the valley beneath, where the air, being warmer, offers little resistance to the furious element. It, however, gradually becomes expanded itself, and, ascending, is often met by a current from the west, when the two together form what is known as the Helm Bar. The natives believe that this bar is so placed to stay the further progress of the wind; but instead of the bar causing any effect on the Helm Wind, it is itself the effect of the wind and the western current already mentioned. The Helm has sometimes been formed, and a loud roaring noise heard, as if in the Helm, and yet there has been no hurricane. This is due, it is assumed, to the nature of the condensation, to the state of the atmosphere in different parts, and to opposing and contrary currents of wind. Generally the Helm Wind rages for from two to four days, but it occasionally continues to blow with terrific violence for ten days at a stretch, causing great damage to crops and property within its area.

St. Cuthbert's Native Place.

DIFFICULTIES almost insuperable appear to lie in the way of fixing accurately the birth-place of our great Northern Saint. Mr. A. C. Fryer, in his "Cuthbert of Lindisfarne," says that, according to the romances of the twelfth century, St. Cuthbert was regarded as a native, not of England or Scotland, but of Ireland; and the place of his nativity is fixed at Kells, in County Meath. Monsignor Eyre, however, in his "History of St. Cuthbert," p. 4, says:—"The origin and value of the evidence furnished in the 'Irish Life of St. Cuthbert,' and quoted from it by other writers, is discussed by the Bollandists, who have shown it to be full of anachronisms. Without rejecting it as fabulous, the author would suggest that the mistake has arisen from confounding the name of St. Cuthbert with that of St. Columba. St. Columba was born of noble descent at Kells, in Meath, where his house is still shown, and where no tradition of any kind connected with St. Cuthbert is known to exist." Count Montalembert, in his "Monks of the West," inclines to believe in the Irish extraction of St. Cuthbert, but without giving the place of birth. Mr. Fryer seems disposed to agree with his Saxon biographers in representing Cuthbert as a native of the Scottish lowlands. He says:—"In some rude hut on the slopes of Earlston, or on the southern skirts of the Lammermuir Hills, the apostle of the Lothians was probably born. Modern writers have associated his birth with the village of Wrangholm, which lay along the base of a hilly ridge, nearly facing Smail-

holm Tower. Of this hamlet every vestige has disappeared."

J. W. CRAKE, Hull.

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In the life of St. Cuthbert, by the late Rev. Provost Consitt, we are told that "it is most probable he (St. Cuthbert) was born in Lauderdale, a district then annexed to Northumbria, which had just been delivered by the saintly King Oswald from the yoke of the Mercians and Britons, and near the spot where the Leader mingles its waters with the Tweed." Mr. John Richard Green concurs in the above, for he speaks of him as "born on the southern edge of the Lammermoor." It was here, on the 31st August, A.D. 651, that the young shepherd saw the vision of angels, descending from heaven and ascending again, "bearing with them a resplendent soul which they had gone to earth to meet." This was at all events the spiritual birthplace of St. Cuthbert, and with his spiritual birth his biographers begin their history.

PETER PIPER, Newcastle.

A Newcastle Institution.

NEWCASTLE readers will readily recognise the accompanying sketch of one of the present street institutions. The peculiar, but sensible, upright cradle-like arrangement, in which the old lady protects herself in all weathers, "rain or shine," is seen every day, near the Central Station,



A Newcastle Orange Woman.

and opposite the end of West Grainger Street. Originally a native of Hexham, where she began her trade of hawking at seven years of age, Ann Ratcliffe came to seek her fortune in Newcastle at the age of four-

teen, and has sat here, and elsewhere, in the streets of this city, following her vocation, since the year the Queen ascended the throne. She has sons in another hemisphere; her husband has long been troubled with the "bornkitis"; and she and her daughter have, of course, a struggle to make ends meet. If Ann Ratcliffe had been able to describe what has passed during her fifty years of hawking experience in the streets of the "canny toon," we should have had a chapter of reminiscences of very considerable interest. It would have been simply invaluable material for the future Brands, Sykeses, and Mackenzies who are to furnish us with the further instalments of "Local Records."

Ralph Ward Jackson.



R. RALPH WARD JACKSON was born on the 7th of June, 1806. His father was Mr. William Ward Jackson, of Normanby Hall, near Middlesbrough. Mr. Jackson was trained to the law, and settled at Stockton. He married, in 1829, Susannah, daughter of Mr. Charles Swainson, of Preston—one son, William Charles Ward Jackson, being



Ralph Ward Jackson.

the issue of the marriage. Mr. Ralph Ward Jackson, as the chief of the old Stockton and Hartlepool Railway, and the chairman of its successor, the West Hartlepool Harbour and Railway, is well known as the founder of West Hartlepool, in whose early career he took the keenest interest, and for the success of which he laboured early and late. In his zeal for its promotion, he outstepped the legal powers of the company, and in the end

retired from the directorship. He was elected first member for the borough of the Hartlepools in 1868, was defeated in 1874, and then retired into private life. Mr. Jackson died on August 6th, 1880.

Jenny Lind in Newcastle.

JENNY LIND, the Swedish Nightingale, whose death, at the age of 67, took place at Malvern on Nov. 2, 1887, paid her first visit to Newcastle in September, 1848. On the evening of the 20th of that month, she appeared at the Theatre Royal in the opera of "La Sonnambula." The greatest enthusiasm was shown by all classes, and the theatre, notwithstanding the high prices of admission (dress boxes, a guinea and a half; upper boxes and pit, a guinea; and gallery, half a guinea), was densely crowded. The receipts were upwards of eleven hundred pounds. Her second visit was in April, 1856, on the 11th of which month she appeared at a grand concert in the Assembly Rooms. The audience, as might have been expected, was an overflowing



one. A number of her ardent admirers in Newcastle purchased and presented to her a beautiful gold enamelled watch, with gold chatelain and seals, which had originally belonged to the Duchess de Montpensier. It was understood that the fair vocalist received nearly eighty thousand pounds during the short tour she made through England and Scotland at that time; but of this enormous sum she returned a considerable part to the public in the

shape of gifts to the charitable institutions of every place she visited, to the amount altogether of several thousands of pounds. Jenny Lind, who had in the meantime become Madame Goldschmidt, paid a third visit to Newcastle on Nov. 7, 1861, when she sang in Haydn's "Creation" in the Town Hall, supported by Mr. Sims Reeves and Signor Belletti, her husband acting as conductor. On the following evening she gave her services at a miscellaneous concert in the same place. Our engraving is copied from a portrait which was taken when Jenny Lind was in the full flow of her remarkable career.

Muckle Jock Milburn.

NORTH TYNEDALE, in the days of the Tudors, was, upon the whole, the wildest and most barbarous district in the North of England. The principal surnames then in the dale were the Charltons—the chief family—who might be considered a half of the population; the Robsons, a quarter; and the Dodds and Milburns, another quarter. They could raise altogether six hundred men, horse and foot, the population being much denser in those free-booting days than it is in our comparatively staid and quiet "piping times of peace," when even a casual "start and overlawn" is held to be an indictable offence, and the "rash bush" on every man's land has to keep his cow. The Robsons are now, we believe, the most numerous sept in the dale, the Dodds ranking next, the Charltons after them, and the Milburns last—we mean of the four old surnames.

Irrespective of their relatively smaller number, the Milburns could never be said to fall short of their fellow-dalesmen of other clans in any of those qualities which distinguished old-fashioned Tynedale men. During the last three or four generations, indeed, most of them appear to have neglected and forgotten the tales of daring enterprise and deadly feud and combat which were rife among their fore-elders down to the middle of last century, when the utter failure of the last Jacobite rebellion led to the permanent pacification of the countryside. These tales once constituted, doubtless, the staple folk-lore of the district; and it is rather remarkable that so few anecdotes have been preserved of the exploits of the gallant Borderers, either by Ridpath, or Scott, or their pleasant garrulous forerunner, Froissart, or in the memory of their lineal descendants.

The late Dr. Charlton, who took great delight in gathering and noting down such traditions as he found still afloat in his native district, communicated, many years ago, to the Antiquarian Society of Newcastle, a curious account of a gigantic man of the name of Milburn, who was one of the last of the real old Tynedale type. He was as famous for the strength of his lungs as

for his prowess in clearing a fair or emptying a keg of whisky. In spite of whisky drinking all his life, he was past his eightieth year when gathered to his fathers. He lived at Bellingham, and his common designation, by which he was widely known, was Muckle Jock Milburn. Dr. Charlton, who knew him personally, has preserved one or two anecdotes which he used to tell. Here follows one of them, as near as possible in the language he used :—

My fore-elder, wi' twa others, gaed yence ower the Borders to lift sheep on the Scottish side; for the Scots thieves had of late been harryin' sair i' Tynedale. They gaed ower by the Coquet hedge, and lifted some sheep near Yetholm, and drove them doon by Reedwater hedge, when the Scots cam' after them, three to three. My fore-elder an' the other twa made a stand upon the Fell, an' the Scots cam' bravely up. Ane of our side fell at the first foregatherin', an' anither was woundit; but ane o' the Scots fell, too. My fore-elder was then sore beset wi' the twa Scots, till he gat a straik at ane o' them wi' his swaard, an' gar'd his hedge spang alang the heather like an ingan! An' then the third Scot tuke aff ower the hills, an' my fore-elder drove the sheep ower into Tyne-dale.

Another anecdote of the Milburns was obtained by Dr. Charlton from the same source. It fell out, it seems, that one of the family, a celebrated fighter, quarrelled in Bellingham with another Borderer, and, of course, the difference was to be decided with the broadsword, or with the whinger or dagger then commonly borne. As the parties stripped to their shirts in the street, Milburn suddenly turned to his wife, who was a spectator of the combat, and cried out, "Wife, bring me out a clean sark. It s'all never be said that the blude of the Milburns ran down upon foul linen!" How the fray ended is not recorded.

Jock Milburn was one of the bailiffs of the barony of Wark for the Duke of Northumberland. Mr. William Brandling, a receiver of Greenwich Hospital during the time when that charity held the barony, occasionally took Jock with him when he went a-shooting on Hareshaw Common, close beside Bellingham; and the Rev. Ralph Brandling, of Gosforth, being one day of the party, fancied that Jock was a little too free. He therefore roundly rebuked him, using sundry uncanonical oaths. Milburn listened awhile with perfect equanimity, but at length he broke in upon the commination service, exclaiming with a characteristic grunt—"Hech, man! they mun ha'e been verra short o' timmer when they myed thee a pillar o' the church!"

Churchill at Sunderland.



CHARLES CHURCHILL, the author of the "Rosciad," the "Prophecy of Famine," the "Candidate," and other satirical poems, was for a short period of his short life a resident in Sunderland. Having become acquainted with a young lady named Scott, whose father lived in the vicinity of

Westminster School, he fell violently in love with her, and, with true poetic want of consideration, precipitately married her, within the rules of the Fleet, to the great annoyance of both his parents and hers. At last, however, his father, who was much attached to him, was reconciled to the clandestine match, and kindly took the young couple home. After spending one quiet domestic year with his wife under the paternal roof, Churchill found it absolutely necessary to prepare himself to earn an independent living. For the Church he had no inclination; but he saw no other outlet for his abilities, nor any other way of pleasing his father. So it was arranged that he should retire to Sunderland (the Rector of Sunderland, the Rev. Richard Swainston, M.A., had been a college chum of his father's), and there spend some time in the study of theology, preparatory to taking orders. Here he seems to have applied himself quite as enthusiastically to the study of poetry as of divinity, though he did not neglect the latter altogether. He remained in the North till the year 1753, when he went back to London to take possession of a small fortune which accrued to him through his wife. He was at this time twenty-two years of age, and had been three years married. The fortune, such as it was, was soon dissipated. Churchill's career came to an abrupt close in the month of October, 1764. He had gone over to Boulogne to pay a visit to John Wilkes, and while there was seized with fever, which carried him off in his thirty-third year.

St. Cuthbert's Burial.



THE subjoined legendary poem, by John Graham Stuart, appeared under the above title in vol. iii. of the *Gentleman's Magazine* (1869). So singularly relevant to the moment—in this, the twelfth centenary of the death of St. Cuthbert—do the verses appear, that, in perusing them, one might imagine they had been suggested by the late pilgrimage to Lindisfarne :—

High mass was said in Lindisfarne,
And, o'er the moonlit wave
The outline of the hallowed fane,
Cloister and arch and tinted pane,
A bright fulgurance gave.

The *De Profundis* rolls on high,
And solemn dies in rest,
As from the porch that opens wide
The monks, like stately spectres, glide,
Hands crossed upon their breast.

Fitful and low the chant ascends,
As two by two they file;
The abbot, with his mitred brow,
Leads forth the bier with stole and bow,
And mutters Aves the while.
Down where the waters seething break
Upon the pebbly strand,
They put to sea with prayer and praise,
The corpse beneath its sable dais,
The breeze from off the land.

The flaming torches borne aloft
Fade silent out of sight,
Save where St. Cuthbert, in his shrine,
Irradiates the phantom line
That follows in his flight.
Slow past the towers of Bambrough,
Where eddying seamews shriek,
Past many a fisher's distant gleam—
Like specks upon their weather beam—
A phosphorescent streak.
At dawn of day the watchers spy
Them from the rocky coast;
All through the darkness and the deep,
Pale with the vigil that they keep,
A wan funeral host.
Sad toll the bells of Coldingham,
A mournful dirge profound,
As, safely moored, they disembark
St. Cuthbert's bones from out their ark,
And lay in sacred ground.
His amulet slipped overboard,
Which grieved the brethren sore;
But pilgrims, I have heard, declare
St. Cuthbert's beads are everywhere,
Along that rugged shore.
And chroniclers there are affirm,
With more belief than guile,
That, in his coffin'd shroud of stone
The saint oft steers his course alone
Towards the Holy Isle.

N. E. R., Fence Houses.

North-Country Wit & Humour.

THE HAUNTED PUBLIC-HOUSE AT GATESHEAD.

Scene, near High Level End, Gateshead, during recent ghost scare. Woman (to policeman): "Whaat dis the ghost come back for?" Policeman: "Oh! she comes te see if she can get the license transfarred to the plyace whor she has gan te!"

THE SCOTTISH GIANT.

Mr. Campbell, a very fat person, known as the Scottish Giant, occupied a public-house in the High Bridge, Newcastle, some years ago. A number of miners visited the giant on one occasion, and several questions were asked Mr. Campbell as to his height, weight, &c. One among the rest asked him his measurement around the waist, when a companion observed, "Weyst, man? thoo can see ne weyst aboot him, aa's sure!"

PLEDGES.

Early one morning, while the workmen from the Newcastle factories were proceeding to work, one of them entered the Cocoa Rooms in Marlborough Crescent. While partaking of some cocoa, his attention was drawn to a large card bearing the following words on it:—"Pledges taken at the bar." After reading it, he exclaimed in a tone of surprise, "By gox! aa never thowt this was a pop-shop before!"

FISHING.

A miner belonging to one of our Northern collieries started off one morning for a day's sport with the rod.

A clergyman overtook him on the way, and began an exhortatory conversation by remarking that he supposed our friend was going to have a day's fishing. "Aye, an is," was the reply. "I go fishing, too," said the clergyman; "but I am a fisher of men." "Aye," rejoined the miner, "and what dis thoo use for bait?"

A NOVEL MASTER-WASTEMAN.

As a party of miners were discussing the temptation and fall of man, it was mentioned that the serpent, as the tempter, was condemned to crawl on his belly and eat dust all the days of his life. An old pitman, who had been listening, spoke up. "Men," he said, "what a forst-rate maister-wasteman he wad have myed. He cud have craaled throo aall the aad returns wivoot either being scumfished wiv stoor or stopped wiv falls!"

RESTRICTION.

At a Sunday-school tea party at Pelton Fell, a few years ago, a bright-eyed, curly-haired "driver-lad," who had been doing full justice to the good things set before him, was observed to stop suddenly, and big tears began to roll down his cheeks. Fearing he was ill, the superintendent went to him, and said kindly, "Wey, Harry! thoo's surely not gan to leave off already! What's the matter?" Harry replied with a sad smile, "Ma dickey strings is ower tight!"

TENT-PEGGING.

During one of the tent-pegging competitions at the Newcastle Exhibition, a competitor struck the wood with his lance and whirled it round his head. "By gox," exclaimed a pitman who was looking on, "he's gotten a fish; luik, luik, he's gotten a fish." "Get oot, ye fond gimmer," cried a man standing near at hand, "that's not a fish; that's a peg-top!"

THE BUTCHER'S LAD AND THE DOG.

A butcher's lad went to deliver some meat at a certain house in Newcastle, where a fierce dog is kept. The lad entered the backyard, and as soon as the dog saw him he pinned him against the wall. In a short time the mistress of the house ran up and drove the animal away. "Has he bitten you?" she asked. "Noa," said the lad, "aa kept him off us by giving him yor suet, and ye just cam in time to save the beef!"

North-Country Obituaries.

Mr. George Bell, one of the oldest and most respected tradesmen of Hexham, died at his residence, Haining-croft, near that town, on the 17th of October, in the seventy-sixth year of his age.

On the 17th of October, Mr. Richard Kelly, who for many years carried on the business of printer and stationer in South Shields, died at his residence, Market Place, in that town, having attained the ripe age of eighty-one years.

The death took place, on the 19th of October, of Mr. John Stephens, formerly chief-constable of Newcastle, and subsequently for a long period superintendent of the River Tyne Police Force. Mr. Stephens became a member of the Metropolitan Force so long ago as 1828, and while in London he took an active part in the formation of the Rotherhithe division of police. In 1835, he came down to Newcastle to organise the police force of that borough—a work in which he was so successful that he was appointed first chief-constable, having under him between eighty and ninety men of all grades. A few years afterwards, the memorable riot known as the "Battle of the Fourth" took place, and the comparatively new constables and their officers were put to a severe test. Their capacity and forbearance, however, proved equal to the occasion, and Mr. Stephens was highly complimented upon the manner in which he restored public order. In 1845, he entered upon the work of the formation of the river force, still continuing to discharge his duties as chief-constable of Newcastle. From the latter position he retired in 1854, but he retained his control of the river force until 1884, when he resigned on a pension equal to his full salary. The deceased gentleman, who was the oldest chief-constable in the kingdom, and who began life as valet to Sir Robert Peel, the founder of the police system as it now exists, was upwards of eighty years of age.

On the same day, at an advanced age, died Mr. H. H. Blair, proprietor of the *Alnwick Mercury*.

Also, on the 19th of October, Mr. John Miller, mineral water manufacturer, of Hexham, died very suddenly in the house of his sister, to whom he was on a visit, at Leith.

The death was announced on the 22nd of October of Mr. Charles Seely, for many years representative in the House of Commons of Lincoln. He had been married to a daughter of Mr. Hilton, who many years ago was an extensive baker and flour dealer in the Sandhill, Newcastle, another daughter having been the wife of the late Mr. R. P. Philipson, for many years Town Clerk of Newcastle. Mr. Seely, who entertained Garibaldi on the occasion of his last visit to England, was eighty-two years of age.

At the comparatively early age of forty-four years, Mr. Herman Ferdinand Nielsen, of the firm of Nielsen, Andersen, and Co., merchants, died at his residence, Elesmere Villa East, Granville Road, Newcastle, on the 26th of October. The deceased gentleman, who was a native of Denmark, having been born at Thisted, in Jutland, came to Newcastle about twenty-three years ago.

The Rev. William Motley Hunter, for many years one of the ablest and most prominent ministers of the United Methodist Free Church, and president of the Conference in 1880 at Leeds, died at his residence, at Jarrow, on the 26th of October. He was sixty-four years of age.

Mr. James Pyman, who, as a member of the firm of Pyman and Bell, had been intimately connected with the trade of the Tyne for about eighteen years, died at his residence in Newcastle, on the 28th of October.

The Rev. John Walters, a minister of the Wesleyan Methodist denomination, who had formerly held appointments at Berwick, Blyth, and South Shields, died at Leeds, on the 29th of October, at the age of seventy-six years.

Record of Events.

North-Country Occurrences.

15.—The foundation stone of new barracks for the Salvation Army, estimated to cost £3,150, and capable of accommodating 1,800 persons, was laid on the main street, Northgate, Darlington.

—A breechloading howitzer exploded at the works of Messrs. Armstrong, Mitchell, and Co. at Silloth, five men being seriously injured.

17.—Mr. Fred. Jules Stein, as lessee, opened the new Theatre Royal, Gateshead, with the performance, by Mulholland's Anglo-American combination, of the Transatlantic drama, entitled "The Unknown."

19.—The fourth session of the North-East Coast Institute of Engineers and Shipbuilders was opened by the president, Mr. W. T. Doxford, of Sunderland.

—Peter Toner, bricklayer, aged 36, was committed to Durham Assizes for trial, on the charge of having caused the death of his wife at Felling. (See under October 11, page 451.)

—Lord and Lady Randolph Churchill, accompanied by Mr. Nicholas Wood, M.P., arrived on a brief visit at the Hermitage, Chester-le-Street, as guests of Mr. Lindsay Wood. On the night of the 20th, his lordship addressed a large meeting under the auspices of the Sunderland Conservative Association in the Victoria Hall, in that town. On the afternoon of the following day, he received addresses at the Hermitage, and in the evening he addressed an open-air meeting in front of the Conservative Club at Chester-le-Street. On the afternoon of the 22nd, Lord Randolph, having meanwhile become the guest of Sir Matthew White Ridley, M.P., at Blagdon, addressed a large Conservative gathering in the Circus at Newcastle; and in the evening he delivered an address on art and science, on the occasion of presenting the prizes to the successful students at the School of Science and Art in Bath Lane, in the same city, the chair being occupied by the Mayor (Sir B. C. Browne). His lordship afterwards proceeded to Wynyard, the seat of the Marquis of Londonderry, and on the evening of the 24th he brought his political tour in the North to a close by addressing a large meeting in the Exchange Hall, Stockton-on-Tees. The reception accorded to Lord Randolph and Lady Churchill was throughout very cordial and enthusiastic.

—The new Baptist Church erected in Osborne Road, West Jesmond, Newcastle, at a cost, exclusive of the site, of about £6,000, and affording sitting accommodation for 700 persons, was opened for public worship.

21.—A man named Horton, about 54 years of age, who had, for about twenty years, performed the duty of bell-ringer at the church of St. Mary the Virgin, Ryehill, Newcastle, was found dead in the belfry of that church, in which, while in a depressed state of mind, he had committed suicide by hanging.

—The Chief-Constable of Newcastle (Capt. Nicholls) was instructed by the Watch Committee to communicate with other large towns to obtain as much information as possible on the subject of Sunday trading.

—A fine young shark, eight feet long, which had been captured off the Tyne, was landed at the Fish Quay, North Shields.

—Judge Holl, presiding at the Newcastle County Court, made an order for the winding up of the Central Permanent Building Society, Mr. Thomas Gillespie, chartered accountant, being appointed liquidator.

—At a meeting of the Newcastle Board of Guardians, it was reported that over £400, in Bank of England notes, had been found secreted in the clothing of Sarah Burdekin, on her removal as a pauper lunatic.

22.—The personal estate of Ald. John Williams, J.P., late of Westoe, South Shields, a summary of whose will was published to-day, was sworn at £45,263 1s. 7d.

—Newbrough Park estate, situated on the banks of the South Tyne, and comprising about 530 acres of rich feeding pasture, was offered for sale by auction, at Newcastle, but on £25,000 being reached the property was withdrawn. Allerwash Farm, containing 447 acres, with a rental of £745, was also similarly submitted, but was withdrawn at the bid of £18,000.

24.—An explosion of gas, immediately after the firing of a shot, occurred in the Brockwell seam of the Ann Pit, belonging to the Walker Coal Company, situated about three miles to the east of Newcastle, by which six men lost their lives, while three others were seriously injured. The names of the killed were:—John Pickard, 55, master-shifter, leaving a widow and nine children; William Richardson, 35, stoneman, widow and family; John Cockburn, single; Anthony Hogg, wife and one child; James Mullen, wife and family; and John Hylton, wife and one child. Cockburn had only just entered the pit on his first working shift, and Hogg had joined the pit only about a fortnight previously. Two of the injured men, Robert L. Wilson and Henry Defty, died on the afternoon of the 26th, bringing the deaths up to eight.

—Mrs. William Riches, the wife of a chemical worker at Jarrow, was safely delivered of three sons.

—At Morpeth, Fanny Isabella Wright, aged 26, a widow, was committed for trial at the Assizes, charged with the murder of her infant child.

25.—The Bishop of Durham laid the foundation stone of a new church, dedicated to St. Ignatius the martyr, at Hendon, Sunderland, which his lordship has undertaken to build at his own cost, as a thank-offering for the blessings that have been vouchsafed to him during the past seven years of his episcopate.

—At Chevington station, on the main line of the North-Eastern Railway, between Newcastle and Berwick, an express goods train from the north ran into an uncoupled engine belonging to a goods train from Newcastle. Shunting operations were going on at the time, and the uncoupled engine in turn ran into a standing passenger train from Amble. A fireman named Charles Watson, residing in Byker Street, Heaton, was seriously injured, and several passengers were severely shaken. The damage to rolling stock was very great, and the line remained blocked for five or six hours.

28.—The autumn assizes for the county of Northumberland and the city and county of Newcastle-on-Tyne, were opened by Lord Chief Justice Coleridge.

—Lord Cross, Secretary of State for India, addressed a meeting in the Armoury at West Hartlepool, under the auspices of the South-East Durham Conservative Association.

29.—Shortly after ten o'clock to-night, the Royal Jubilee Exhibition on the Town Moor, Newcastle, was

closed without any formal ceremony. The attendance on the final day, having reached 54,716, was the largest number recorded on any single day since the opening on the 11th of May. The total number of persons who had passed the turnstiles during the continuance of the Exhibition was 2,091,646.

—At the workshops and factories on Tyneside to-day, and on the following day (Sunday) at the various churches and chapels of the city and district, the annual collections on behalf of the local medical charities were made. Of places of worship, Jesmond Parish Church headed the list for the third time in succession, the sum realised being £104 2s. 4d., or an increase of nearly £10 on the previous year. Brunswick Place Wesleyan Chapel, with £73 0s. 11d., indicating a slight falling off from last year's amount, occupied the second place.

General Occurrences.

OCTOBER.

17.—A splendid drinking fountain, the gift of Mr. G. W. Childs, of Philadelphia, as a memorial of the Queen's reign, was inaugurated at Stratford-on-Avon.

18.—Mr. Gladstone visited Nottingham and delivered political speeches.

20.—Death of James Alexander Beresford Beresford-Hope, M.P. He was the author of three books relating to Church matters, two novels, and numerous pamphlets, papers, and articles, and was proprietor of the *Saturday Review*. It was to Mr. Hope that Mr. Disraeli applied the famous phrase, "Bastavian grace."

22.—Mr. William Pickard, miners' agent, died at Wigan, Lancashire.

23.—Mr. Wilfrid Blunt was arrested at Woodford, Ireland, for endeavouring to hold a meeting which had been proclaimed by the Lord Lieutenant. He was subsequently sentenced to two months' imprisonment, but was liberated pending an appeal against the sentence.

—An agreement was concluded between England and France as to the Suez Canal and the New Hebrides, a convention being signed a few days afterwards. The settlement of these questions was hailed with satisfaction in both countries.

—Death of Sir H. W. Gordon, brother of General Gordon.

25.—The French Government was defeated on a motion to inquire into certain scandals about the sale of decorations. The names of General Caffarel, General d'Andlau, and M. Wilson, son-in-law of the President of the Republic, were mixed up in the affair.

26.—William Huhter, a tramping blacksmith and street vocalist, was sentenced to death at Carlisle for the murder of a female child about four years of age.

30.—A terrific gale swept across the English Channel, when much damage was done to property, several ships were driven ashore, and many lives were lost.

31.—Mr. William O'Brien, M.P., having appealed against a sentence of three months' imprisonment for delivering speeches at Mitchelstown, on the 9th and 11th of August, which were alleged to incite to resistance of sheriffs and bailiffs, the case was heard at Midleton, in county Cork. The sentence was confirmed, and Mr. O'Brien was immediately arrested by the police, amidst a scene of much excitement.



THE • JUBILEE • CHRONICLE

OF THE

NEWCASTLE EXHIBITION,

BEING A REPRINT OF THE

Newcastle • Daily • Chronicle's

Report of the Proceedings at the Opening of the Exhibition,

WITH DESCRIPTIONS OF ITS CONTENTS.

AND SPECIAL CONTRIBUTIONS ON ITS PRINCIPAL SECTIONS

BY EMINENT EXPERTS.



LONDON: WALTER SCOTT, 24 WARWICK LANE,
AND FELLING, NEWCASTLE-ON-TYNE.

1887.

P R E F A C E.

THE object of the *Monthly Chronicle* was to rescue from the comparative oblivion of a newspaper file much valuable and interesting matter that was deemed worthy of permanent record in the more easily-accessible volume form.

In like manner, the Publisher now offers to his readers the *Jubilee Chronicle* as a permanent embodiment of the valuable and interesting reports which the *Newcastle Daily Chronicle* presented as a record of the proceedings connected with the opening of the Jubilee Exhibition.

On previous great occasions, the reports of the *Daily Chronicle* have been summarised and thus presented to the public in volume form, but in the present instance the Publisher is enabled to present the complete series of reports through the courtesy of the Proprietors of the *Chronicle* in placing at his disposal the whole of the matter in type.

He is thus enabled to present, as a candidate for public favour, a readable volume at an unusually cheap rate, which he trusts will be useful to readers abroad as well as to those at home.

FELLING-ON-TYNE, May 1887.

THE JUBILEE CHRONICLE

PART I.

A JUBILEE OF INDUSTRIAL PROGRESS.

Reprinted from "The Newcastle Daily Chronicle," of May 10, 1887.

"Through the shadow of the globe we sweep into the younger day.
Better fifty years of Europe than a cycle of Cathay."
—Locksley Hall."

"Better fifty years of Europe" is the song of the Lord Laureate. But few can imagine what are embodied in the "fifty years." Herbert Spencer, going from one civilisation to another, was struck with "the immense development of material civilisation" which he saw in the United States. And the change is trifling between the continents to what it has been in this land in half a century. It is difficult to conceive that fifty years only separates us from a period when travel and transit were slow and difficult, quick communication impossible, when the hand was little aided by machinery, when flails thrashed much of our corn, when gas had not ousted the candle or the oil lamp from many towns, when corporations were often self-elected, corn was heavily taxed at our ports, and dissent was tabooed in many a council, alike for local and Imperial purposes. Glancing back, prominent points of difference may bulk out, but the difference between them and now is so great that in the words of a picturesque historian we should not recognise "one landscape in ten thousand." And in the North the changes are even greater than they are in the general, for the North has been in mining and engineering the pioneer, and thus its works are most evident in its own locality. In many of its branches engineering—"the devising or forming engines or machines, and in directing their applications"—in many branches engineering is the outgrowth of the half-century; and remembering the development in all branches in that time, and the manner in which mining has been systematised, and other arts have grown and been widened in area and application, it is not too much to claim that this year is a jubilee year in the industrial development of the North.

A GLANCE BACKWARDS.

Half a century enables us to withdraw, as it were, from the deafening din of change, and to observe impartially the effects, as well as to ascertain with a little more accuracy than is possible in the midst of the turmoil, the extent of the movements and the results that follow. The projectors of these changes have mostly passed away from the scene; but if they rest from their labours, there

are those who knew what the works were, what the condition alike of the land and the locality were before the fifty years had begun their course, and thus, near enough to ascertain the cause and the effect, yet distant enough to escape the blinding dust, we may look at the changes in fifty brawling years. Look for a moment at points in the contrast that spring at once to the memory. Gateshead had not a fourth of its present population; South Shields a third only; West Hartlepool was undreamt of; Middlesbrough was a small town, without dock, ironworks, or factory, and with not a twelfth part of its present population. Again, glance at the condition of rivers and ports. Less than forty years ago the depth of the channel of the Tyne, over the bar, was less than 6 feet 8 inches; sands and other obstructions were many between Newcastle and the sea; and the old bridge obstructed navigation and the flow of the tide. In the river Tees, again, though the "Cut" of the Tees Navigation Company had shortened the course of the river from the sea to Stockton, yet in the estuary the navigation grew worse, and there were shifting, shallow, and tortuous channels. Hartlepool old dock had been opened, but, not so many years before, the inner harbour had been "enclosed for agricultural purposes." There was scarcely a steamer owned at the North-Eastern ports, though one or two sailed to and fro. The Northern coal trade was just emerging from dependency on the old system of working with gin and corf, and in the manner pictured in the "Pitman's Pay." In the lead mining districts, ancient machinery was in use, but there was not the competition that there is now with the rich lead of other nations. In agriculture, the olden style prevailed, and a few farmers in Northumberland were credited with continuing the use of oxen for ploughing. The sickle and the scythe were used instead of the reaper and the mower; there was no steam plough, and want of communication had much to do with the prices for produce the farmer received. The harvest of the sea was also taken in olden methods, and limited and few were the "catches" to those of to-day. Northumberland had, in 1831, a population of 236,959; and Durham one of 239,256; the former county had for the decade previous added to its population at the rate of 2,394 persons yearly; and the latter county had in the same time increased 4,615 yearly. What the rate of increase has been since we shall later find; and if the cause

of that increase and of the ability to supply the increased population with its food and its fuel, its clothing and its multifarious needs,—if that cause be sought, we shall have to look largely to the locomotive, the steamship, and the power which generates steam and propels on land and sea. With limited communication, the two counties of the North which hold most of that carboniferous treasure practically slept fifty years ago ; along the courses of the rivers there was a semblance of life, and a miniature industry. Little mines brought their coal to the surface, and barges and keels conveyed it to vessels down the rivers. Lead was brought on the backs of asses to the ports. The rivers were the highways for what trade there was, and to some extent for the passengers also. Towns fifty miles apart were remote from each other as are Newcastle and Norwich now. Harvests plentiful in one place and precarious in another caused the price of food to be widely different with distances of not many miles between the markets. The coally treasures of the Tyne supplied the Thames, but it was by a fleet of sailing vessels, and thus a storm or a contrary wind had much to do with the price of coal in London, and with the amount of work at the pits in the North. Collieries, trades, and towns in the two counties were dwarfs to what they now are. The familiar sights of to-day were then undreamt of : the railway station, the public park, the free library, the telegraph, and the post office as we know it had no part in the landscape. Looked at from the distance of half a century, the men who moulded what was to them the future, recall the idea that "there were giants in the land" in those days. John George Lambton, Earl of Durham, in the local political world ; the Stephensons in engineering ; John Scott, Earl of Eldon ; the Loshes, the Bells, the Allhusens, the Bolckows, and the Pattinsons in commerce ; the "clipper shipbuilders" of the Wear—these are amongst the men whose names spring into the memory as having had their share in that great development of North-Country life which began fifty years ago. It was hard work in those days to build up industries ; and it was only by one faculty that these industrial changes were wrought. It was the genius of endurance and perseverance ; the faculty of labour almost continuous, and the intent plodding work which built up the commerce of the North.

NEWCASTLE HALF A CENTURY AGO.

Coming to the town of Newcastle, we find it was then circumscribed in its boundaries, limited in its number of inhabitants, and yet having begun to know its subterranean riches and its needs. Its cattle market had been established ; it was dreaming of lines of steamers ; on the site of the town house of the Earls of Westmoreland it had built the home for its Literary and Philosophical Society. Grainger was stretching out the town, and had bought and was building on Anderson Place and its grounds ; but still the town was—compared to what it now is—dwarfed and small. In itself, in its institutions, and in the people employed, it was but a tithe of what it has now grown

to. The new borough police, 85 persons in all, were taking charge of Newcastle ; omnibuses had recently begun to run between Newcastle and North Shields ; letters from Newcastle to London cost 8d. each by the Menai steamer ; and the "new road, leading from Westgate Street to the Scotswood Road, near the Infirmary," had been recently opened. The denes were rural sights, outside the city. There was no railway into Newcastle in those days. In 1835 that part of the Newcastle and Carlisle Railway between Blaydon and Hexham was opened, but "passengers from Newcastle were conveyed to Blaydon by omnibus." The part from "Elswick Shot Tower to near Blaydon" was opened in 1839 ; and in the same year the Newcastle and North Shields Railway was opened.

There were few or no steamships regularly plying from the Tyne then. The *Vesta*, 300 tons register, began in May, 1837, a weekly service to Leith ; and a company for promoting the trade between the Tyne, Hamburg, and Rotterdam began a little later, in 1839. At the Post Office not a dozen persons were employed ; there was no telegraphic communication ; and thus, with the absence of railways and of telegraphs, with slow communication by coach or sailing vessel, many of the facilities of modern civilisation were absent. There was not one cab in Newcastle fifty years ago. There are about 190 now, in addition to some 40 tramcars.

INDUSTRIES FIFTY YEARS AGO.

The industries of Newcastle and district had begun that remarkable increase which may be attributed in large extent to facility of communication and of transmission of supplies for the needs or the wants of the world. There was a vend of coals in 1835 of about 3,290,000 tons coastwise, and 494,485 tons foreign—in all, some 3,784,996 tons. There were two blastfurnaces at Birtley ; two at Lemington ; and one at Wylam. The Longridges had rolling mills at Bedlington ; the Walker works were begun in 1827 by Losh, Wilson, and Bell ; and Hawks, Crawshay, and Co. were iron manufacturers years before at Gateshead. At Newburn the Spencers, and at Derwentcote the Cooksons, were steelmakers. The chemical works at Walker, Bill Quay, Felling, Jarrow, and Friar's Goose were at work ; glass was largely made on the Tyne ; the earthenware trade had been planted at St. Peter's and the Ouseburn ; shipbuilding on the river was of wood. Engineering is a trade of old date on the Tyne ; and fifty years ago at Gateshead, Walker, and Forth Bank the Hawkses, Bells, and Hawthorns were at work, whilst it would be unpardonable to forget that in South Street there had been established by Stephenson, Pease, and Richardson the first locomotive factory in the world. In this northern district, there were also then the repairing and engine-building works of the Stockton and Darlington Railway at Shildon, and the private works of Mr. Hackworth ; whilst Darlington had benefited by that primal line, and its foundries had grown, and wagon and engine works were contemplated, if not begun. Wooden shipbuilding had intermittent activity on the Wear and the Tees ; the whale fishery gave lessening work

to fleets of Whitby vessels ; and whilst the coal trade was declining at Stockton, it was growing lower down the river. On the northern bank, though the furnaces had not been built, or perhaps dreamt of, there was an industry which has long since died out—that of glass ; and there was an attempt at other industries at the village of Haver-ton Hill, though none seemed to imagine that wealth in salt was deep below its surface.

These are prominent points in the comparison between the North-east fifty years ago and now ; but we have to take more than this mere surface view if we have to learn the extent of the change, and the causes of that industrial development which locally and nationally has in that period been known. Industrial exhibitions serve several ends, not the least of which is that they direct the mind to the growth of local and national industries. Its has been well said, "that vast national benefits have sprung from exhibitions, in all technical respects, in the improvement of industry, in the expansion of art, cannot be for a moment disputed. We have the proofs before our eyes and in our hands. If the social profits of exhibitions are less apparent, less positively ascertainable, there is room here at least for faith and a cheery view of the matter." And when we turn to fifty years ago, and find that in the opening year, half a century ago, there was issued that pamphlet "Post Office Reform : Its Importance and Practicability," out of which penny postage sprung ; and that in the same year the electric telegraph was invented, and steam communication with America established, these great national developers of commerce give ground for the description of the present year as the *jubilee year in industrial development*, as well as in that of the reign of the Queen.

THE COAL TRADE.

In the endeavour to trace the progress and the extent of the industrial development of the North, there cannot be much doubt as to the point of commencement, for there is one industry which is the groundwork of the commerce of the North, the cause of construction of its railways and harbours, and the stimulator of its engineering, its naval, its chemical, and its general industries. That industry is—coal. The coalfield of the North encloses in an irregular triangle much of that potential energy which has given life to the commerce of the district. There are in the total area some 300 square miles, or from that to 840, according to estimates of different authorities. Taking the latter figure, we have then the division, 594 square miles to the county of Durham, and the remainder to Northumberland. For more than six centuries that coalfield has been drawn upon for fuel and power. And as for years that production increased, the reserve of strength and heat was largely drawn upon, though the authorities have not agreed upon the amount of the remainder. The latest estimate was that furnished to the Royal Commission by Sir George Elliot and Mr. Forster. Their conclusion was that there were in 1871 in Northumberland and Durham, at depths not exceeding 4,000 feet, and in seams of not less than 12 inches, some 10,036,660,236 tons of coal unworked. We may

take these figures as sufficient for our purpose, without going back to the differing estimates of Greenwell, Hall, Hull, or Taylor. And as we have tolerably accurate statements of the quantity worked in the years since that estimate was made, we are able approximately to draw some deduction as to the unworked coal in the great Northern coalfield now. Since the date referred to the output of coal in the North has been one which has increased on the whole, but with fluctuations. It has varied from 29,000,000 tons in round numbers to 36,000,000 tons ; and, therefore, if we take the figures of Sir G. Elliot and Mr. Forster, and deduct therefrom 500,000,000 tons, we shall find that the "available coal" in our coalfield may be put approximately as about 9,536,660,236 tons, so that the large output of the present time could be kept up for a long period. And there are certain possibilities which might indefinitely prolong that period—the working of coal further under the sea, for instance. But there are other contingencies adverse. The period of exhaustion has been put at "331 years" by Greenwell, whilst Mr. T. Y. Hall assigned a still shorter period, and in the valuable address of Sir W. G. Armstrong, given to the British Association in 1863, there occurs the passage "it is generally admitted that 200 years will be sufficient to exhaust the principal seams even at the present rate of working." And it is in this direction that the danger of the future lies. Long before the bulk of the coal is wrought out, certain seams and kinds of coal will have gone, and that left may be less cheaply worked, or may be of a quality not so valuable or fitting for distinct purposes. But, on the other hand, the resources of science may in degree meet that difficulty. For instance, a large tract of the coking coalfield of Durham has been worked out, but in recent years it has been demonstrated that other qualities of coal, disintegrated and treated, will furnish coke as suitable as that from the famous seams of South Durham ; and with the larger use of the coal that is drawn—a larger use made possible by better engines, more economically working machinery, and less wasteful use of the fuel—the period of the duration of coal might be greater than has been supposed.

Coming next to the changes which fifty years have seen in the coal trade of the North, at the outset we are met with the difficulty that there are no official statistics of the coal output of the North before 1854. Prior to that we have scattered and not uninteresting records of the coal trade. But, a little over fifty years ago, Mr. Hugh Taylor gave evidence before a committee of the House of Lords. He estimated the vend of coals then for the coalfield of the North at about 3,500,000 tons yearly. That was for the year 1829. There was a comparatively rapid growth in the shipments of coal from some of the ports during the next few years ; and that continued, as is evident by the fact that when we arrive at official statements of output we find that in 1854 the coal production of Northumberland and Durham was 15,420,615 tons, and after that time it advanced slowly. There was a period then of rapid increase, and then one in which the coal output was stationary ; and thus, from various causes, the output of coal in the North-east of England has varied—

rising with more or less rapidity for some years, and then falling off again for two or three years. But the following statement, showing the output of coal from Northumberland and Durham for several illustrative years, will have great interest, and it may be taken as the first of the proofs of the industrial development of the North in half a century of remarkable growth. The coal output for the years named may be thus put:—

NORTHERN COAL OUTPUT.

Year.	Authority.	Output. Tons.
1829...	Taylor's estimate.....	3,500,000
1854...	Official report.....	15,420,615
1875...	".....	32,097,323
1882...	".....	36,299,000
1883...	".....	37,400,000
1886...	".....	34,780,000

Although there have been fluctuations, and the last three years have reduced the production in the North, yet it will still be seen that the diminished output of the last year was considerably more than double that of the year when the official returns began to be published, and may be assumed to be about seven-fold what it was 50 years ago. The railway and the steamship have opened up new markets for the use of coals, and have themselves become very large users of that fuel. The upgrowth of the iron trade has demanded coal and coke to supply its needs; and the consumption for gas, for household purposes, and for manufacturing needs generally, has contributed to the enlargement of the use of coal, which the figures above show has been met by the mines of the North. But other considerations than the mere coal have had play—miners, machinery, and modes of working have all had their influence on that enormous development of the output of coal. In speaking of the persons employed about the mines, we have to remember that whilst at the end of last century it was computed by Dr. McNab that about 17,000 persons were employed at the collieries "of the Tyne and Wear," yet there were included in that number the many keelmen, fitters, and trimmers employed in shipping the coals. Not till 1854 have we really reliable data to estimate the number of miners of the two counties; but from the figures obtainable since that time we may compile the following table, showing the number of persons employed in and about the coal mines of Northumberland and Durham:—

NORTHERN MINERS.

Year.	Authority.	Number of miners.
1854...	Hunt.....	38,801
1863...	I. L. Bell	47,300
1879...	Inspector's Return	89,539
1884...	".....	92,359
1886...	".....	100,777

The largest number employed at the mines was in 1885, but the number for the past year is only slightly less than that of the preceding year. This enlargement of the number of the miners whilst the output has been stationary or receding, is one of the facts that need the attention of the producers of coal in the North. But what at the present concerns us is that there is an enlargement of the output of coal to a very large extent. The

production has been more than doubled since the commencement of the authentic records, and the number of persons employed in and about the mine has been enlarged much more rapidly in the same interval.

It is well worthy of record that in the half-century that increase in production of coal has been stimulated and made possible by the improvement in the machinery for raising the fuel, and for the needed improvement of the working and ventilation of the mines. A little over fifty years ago the cage was introduced into Durham by Mr. T. Y. Hall, and the corf has long ago been banished. Steam power, compressed air, and other methods of cheapening the cost of the conveyance of coal below ground have been adopted, and the "endless haulage" system has had its part in the same direction, so that an enlarged production has been made possible even when the coal has needed to be drawn from deeper pits, and longer distances in the mines. The ventilation of the mine has necessarily had to be greatly increased, by an enlargement of the furnace power, and by mechanical ventilation; whilst the larger dimensions and numbers of the air courses, and the division of the main current of air into separate "splits" or currents, has rendered possible the better division of the air. In some mines increasing working has brought larger volumes of water, and vast "feeders" have had to be pumped out, the volume of water so drawn being twenty or twenty-five times the weight of coals, in some instances. Hetton Colliery proved the existence of coal worth winning under the magnesian limestone in 1821; Murton extended the area of the workings a few years later, and the feeders of water met with were such as could scarcely have been dreamt of. Murton sinking is said to have cost £400,000—an amount contrasting strangely with pits sunk last century near Newcastle at a cost of "about £55." And, at times, the occurrence of large volumes of water has necessitated the use of other methods of sinking the shafts—the Belgian system having been adopted at Whitburn. Attempts have been made to introduce mechanical coal-hewers, but as yet with only partial success. Very considerable changes have been made in the manner of bringing down the coal, and others are in course of trial; and, generally, it may be said that the change in the methods of quarrying coal, of its transit under ground, and of raising it to the surface, with all the changes which have been useful in connexion therewith, have been at least as important and as full as those of the production of coal and of its disposal.

MINES AND MINERS FIFTY YEARS AGO.

It is nearly fifty years since the commencement of a little fortnightly paper printed in the Side, Newcastle, and intended to advocate the claims of the miners. It is worth referring to that old paper to obtain an idea of the position of the mines and miners half-a-century ago—remembering that the statement is made by a friend of the miners, sometimes a friend more zealous than judicious. Fifty years ago, when Martin Jude kept the "Three Tuns, Manor Street," and Daniels, the editor of the

Advocate, had his office at "4, Picton Terrace," the Union of the miners had its agent lecturing in various parts of the country. There were strikes in those days, as now—"Thornley Colliery" was on strike, the men complaining that "their coals were weighed by a fraudulent machine." The bond was put in force, and six men were sent to prison, and some of the men were writing letters to "wipe off the blasting censure which a "pusillanimous scribe" had in Durham put upon them. There had been an outrage in the village, there were charges of complicity by the men, and the Pitmen's "Attorney-General" was being brought down to test the strength of the bond. The first Conference of the Miners' Association had been held at Newcastle; the miners of Haswell Colliery were complaining of the "set-out tubs;" the Seaton Burn men had been paid "7s. 6d. per score with 4d. per score double;" there was an awful explosion at West Moor, and the jury "composed of butchers and shoemakers" returned a verdict of accidental death. Then came a great meeting in Newcastle, in which speakers from Thornley complained of the "masters' monthly bond," others complained of the "tax on export coals," and an aggregate meeting was held on the Town Moor attended by "from 12,000 to 14,000 persons," which concluded with the voting of thanks to "Sir John Fife for his kindness in granting the use of the ground." The employers contended, at the time of that strike, that the men could earn "3s. 8d. per day of eight hours," but this the men contested. In that strike the men believed that "22,000 men and some 10,000 boys" took part in Northumberland and Durham; it caused the receipts of the Durham and Sunderland Railway to fall off for a time about three-fourths; evictions began, and after a nineteen weeks' strike, the want of public support, and the "great influx of strangers to supersede the native miners," brought the dispute to an end without result. The strike, however, broke out again at 27 of the Tyneside collieries, but "sheer necessity" compelled the return to work at last. There was a trial at Durham, which illustrates the feeling of the miners in those days—that which was known amongst pitmen as the Wingate wire rope case, and in which the men at the colliery at that place objected to work because they were let down by a wire rope. And thus the records run—of strikes, generally unsuccessful; of small pay and scant work, of accidents, offences, conferences, and of trials in which the strong words of the "Pitmen's Attorney-General" usually brought rejoinders as strong to Mr. Roberts. Most of the actors of those days have passed away, but the few who remain will acknowledge at least that the pits are safer now, that accidents are less frequent, that ventilation is better, and that there is some attempt to meet the needs of the miners for light and air and better appliances below, whilst schools are more abundant, conditions of hiring less harsh, and there are other signs of progress, industrial and social. In the mine, there are better means of overcoming the evils of water and of marsh gas; in the homes of the miners, there is more of the comforts of civilisation, and for the table of the miner the world is scoured—beverages from the East, the products of the far lands of the West, the dairy

produce of Ireland and the Continent; light is from the oil wells of America and Russia, and there is as much contrast between the mine of to-day and that of fifty years ago as there is between the modes of work of the pitman in the two periods.

DURHAM COKE.

"Durham coke" may be said to be known in metallurgical circles all the world over. Durham is the chief coke-producing district of Great Britain, it is claimed that its quality makes it "superior to anything that can be produced in Great Britain, or indeed in any part of the world;" and it is to this pure coke that the North owes its iron trade; produced in such vast extent from "a very inferior and imperfect ore." Over a large part of the North, from Tyneside to Shildon, the coke manufacture shows its traces: that hard, compact, and silver-grey fuel shows itself on all the Northern railways, and row after row of ovens throw fierce pencils of light on the path of the traveller by rail, river, or road in the North. The coke manufacture is comparatively modern, but it is one which has had rapid growth. For locomotive use it was for some time imperative under certain conditions, but it is to the iron trade that the demand owes its present largeness of volume. A short time ago figures were compiled from authentic records which substantially trace the position of that great industry of coke which, from the Tyne to the Tees, exerts so vast an influence on the coal trade of the North. Quite recently there was coke kept in store for use on railways in case of scarcity of other fuel, but practically coke has ceased to be used for locomotives in the North, though some attention has been given to proposals to use it for marine boilers. The statement we have referred to in relation to coke production is as follows:—The coke trade has within the last few years become one of the most important, furnishing, as it does, a very considerable portion of the raw material for the iron manufacture, and consuming in its own manufacture no inconsiderable part of our output of coal. Within a comparatively recent period the industry has acquired large dimensions, stimulated in a very great degree by the growth of the Northern iron trade. Less than thirty years ago the production of coke in the kingdom was estimated at 2,500,000 tons; twenty years ago the output was about 3,500,000 tons; but now it is believed that in the County of Durham alone over 4,000,000 tons of coke are annually manufactured. In South Durham, where the largest part of the coke is made, it has been estimated that over 16,000 coke-ovens have been erected, and that the consumption of coal at these has exceeded 30,000 tons daily. This, it is true, is a mere estimate; but there are authentic figures which go to support it. There are, it is known, about 1,700 coke "drawers" in the Durham district, and the quantity of coke "drawn" yearly by each may be taken as about 2,800 tons. The chief part of the coke is made from coal extracted from the western part of Durham, the area of the field being over 250 square miles; but it has been supposed that it is unable to afford coal for much more than six score years at the present rate of consumption, and that rate is

increasing. Hence more than mere local importance attaches to the efforts now being made to utilise for the coke manufacture large quantities of coal, in the eastern part of the county, by its disintegration and washing. At a cost of about one halfpenny per ton coal can be reduced to powder, and so improved as to fit it for the manufacture of coke, and thus to lengthen the life of what may be called the "coking coalfield." For the very large proportion of coke used in the manufacture of iron purity is essential; but the area of the field of coal fit for the purpose is very small, and many and costly experiments have been unsuccessfully attempted to enlarge it. The plan of disintegration has attained more than experimental success, and its trial on a scale of great magnitude will be watched with interest by all interested in the use of the pure fuel so necessary to manufacturers and on locomotives. To this it may be added that coke made by the method hinted at is now generally sold, and that the total output of Durham coke may be stated as about 4,500,000 tons yearly now. Of this it is computed that about 3,500,000 tons are used in the iron trade of the North and West Cumberland and Furness. Lincolnshire and the South are the chief users of the rest, though a not inconsiderable quantity is sent abroad, Spain being an especially large user of the coke of Durham. Very many attempts have been made to improve the process of manufacture of coke—the Carves' oven being one of the most successful. It had, however, another object in view—that of the utilisation of the waste products evolved in the manufacture. But the fall in the price of the product has lessened the desire to extract and utilise these waste products. Under this head, also, the attempts of the Jameson process have been successfully made—one of its difficulties, that of the securing of ovens which were air-tight, having been at last overcome. The growth of the coke trade in Durham is one of the results of the enlargements of the iron manufacture, and its fate is largely bound up with the latter industry. But there is an increased work obtained now from the coke, and an increased smelting power from other sources, so that the production of coke in Durham does not now rise concurrently with the output of pig iron. The old and wasteful method of manufacture still largely prevails.

IRON MINING.

The story of the iron mining trade of the North has often been told, and it is not needful to do more than outline the growth of the industry. Fifty years ago the iron industry was in existence, but it was on a miniature scale. Bewick tells us how the industry commenced, how searches were made in Cleveland and in the Esk valley especially. Finally, iron was struck at Eston, but those who discovered it had no conception of the development which would result, for they anticipated "1,000 tons of ironstone would be weekly taken from Eston," whereas the output is more than tenfold that quantity. When the first of the "mineral statistics series" was issued, Cleveland yielded not less than 650,000 tons of ironstone, but that is a slight part of the production now, though the maximum yield has not

been maintained. In 1860, the production was over 1,000,000 tons; in 1865 it doubled that quantity, and in years of intense demand there was a later enlargement, which, with the figures for the latest year, we may thus tabulate:—

YEAR.	OUTPUT OF IRONSTONE.
1868.	2,875,307 tons.
1869.	3,094,677 "
1870.	4,072,888 "
1871.	4,581,901 "
1872.	4,974,950 "
1873.	5,435,233 "
1874.	5,428,497 "
1875.	6,085,541 "
1876.	6,571,968 "
1877.	6,280,000 "
1878.	5,316,477 "
1879.	4,714,535 "
1880.	6,441,783 "
1886.	5,370,779 "

The declension in late years is due to the fact that the demand for iron is now largely for the qualities which are fit for use in the steel manufacture. In the years which the above figures cover, the area from which the ironstone of Cleveland has been drawn was widened, and the mines to the east of Eston now supply a larger part of the total production than they did few years ago. For a long period the ores of Cleveland were unused in the production of steel—their unsuitability, owing to the presence of phosphorus, being well known. Efforts to use the ores for the purpose were made by Sir I. Lowthian Bell, but in the years 1873 and 1879 the Thomas-Gilchrist method of dephosphorising the ores was perfected, and in 1880, the large converters which had been constructed for the work were tried. In the words of Mr. E. W. Richards, who has done so much to bring forward the process, "the basic process has been brought to a technical and commercial success at the Cleveland steel works of Bolekow, Vaughan, and Co.," and to that success is due, in considerable degree, much of the later enlargement of these works. And at these works, and at those of the North-Eastern Steel Company, the process is actively carried on, on a scale of some magnitude.

CRUDE IRON.

If, next, we look at the crude iron trade, we shall find that half a century has witnessed the upgrowth of that trade in the North-East of England; and, as is well known, there are few stories that have more of romance than that of the development of the long hidden iron deposits. The trade fluctuates—moving its seat from place to place as supplies of ore or fuel need. As the years have rolled on, the needs of the world for crude iron have been enlarged, the railway system widened the area of use, and so did the transfer of shipping from wood to iron. Iron has been made cheaper by that larger demand bringing more and more makers into the field, and enlarging the produce of different districts. It was thus that the earlier producers of iron in the North built their furnace to use local ores, and it was these considerations which built up great works on the Tyne, in Durham, and on the Tees. This latter development in Cleveland at a time when more and more crude iron was needed

was remarkable, and it gave rise to the creation of allied and contributory industries. The "advantages of the position of Cleveland appreciated, and after the first obstacles had been overcome, there were many who were ready to follow. The men who erected the pioneer furnaces thirty years ago, Bolckow and Vaughan, Bell Brothers, Samuelson, and others, were the pioneers not alone of the iron trade, but of other industries that followed the creation of that great trade. Iron shipbuilding, within a very few years after the blowing in of the first furnace in Cleveland, was commenced at Stockton, at West Hartlepool, and at Middlesbrough; engine building had preceded that erection, but engineering on a larger scale followed it." But all this was within the half century now under review. We have no exact record of the output of the furnaces of the North in the early days of the art, but we have records of the number of furnaces themselves, and we may give the statement now fittingly.

BLAST FURNACES IN THE NORTH-EAST.

Year.	Authority.
1836.	Bell.
1849.	Bewick.
1863.	Bell.
1881.	Cleveland Ironmasters.
1887.	

* Including several old ones at Norton, Stockton, and elsewhere, now dismantled.

But it is not only in the number of the smelting furnaces that the change has taken place; it is shown much more fully in the dimensions of the furnaces, in their mode of working, and in the general economy of the furnace. The first blast furnaces built in Cleveland followed the dimensions which were general in the trade—they were 42 feet high, and the cubical capacity was about 4,500 feet. Enlargement was slow at first, but in 1860 Messrs. W. Whitwell and Co. erected their Thornaby furnaces 60 feet high, and made their boshes 20 feet in diameter. Messrs. Bell Brothers, Bolckow and Vaughan, and others gradually increased the height, the diameter, and the dimensions; and all the old furnaces were one by one enlarged, so that, in the words of the late Mr. Thomas Whitwell, "the average Cleveland type of furnace is now about 80 feet in height, and 23 feet to 25 feet bosh." This has proved to be, when supplied with air heated to a given temperature, "as economical a form as can be devised for smelting the ironstone of Cleveland." There are furnaces in the North larger than these, for at Ferryhill there are "monsters over 100 feet" high, and thus this district has attained the honour of building the largest furnaces in the world. Substantially, the output of iron in the North-East may now be put at 2,500,000 tons, but an increased quantity of this is obtained from the rich ores imported from Spain and the South of Europe.

The Cleveland district has surmounted the difficulties connected with the attempt to utilise what were waste gases escaping from the furnaces, and now "every furnace in the district distributes its gas to the boilers and hot-air apparatus attached to the works," so that little or no coal is needed for that purpose. More powerful hot-air stoves have

been introduced, more regular heat attained, and a large reduction in the consumption, with a vast increase in the production of iron in a given time, is the result. It is the general belief that all that can be hoped for in reducing the consumption of coke has been effected; but the fact that there are "twenty different varieties" of furnaces, varying not alone in height, but in dimensions of bosh and hearth, in the grade of bosh angles, in the number of the tuyeres, show that experience is slowly determining the most economical form and order, and deciding in what degree gases are to be heated, and to what extent coke is to be used in the smelting operation. Difficulties have shown themselves from time to time—difficulties chiefly attributable to the nature of the ores of Cleveland, and in the later years there has been needful the importation of large quantities of the richer ores of Spain, and thus there is produced in the North still the yearly two and a half million tons of crude iron which feed the forges, foundries, and mills of so many iron and steel manufacturing districts. There has been a change in the mode of using that iron. In early years of the period under review, the use of it for the forges was enlarged, and that enlargement increased in ratio, but has had in the last decade a serious check, for a newer competitive form of metal is crowding puddled iron out of the race. And, in consequence, the production of manufactured iron has in recent years decreased with some rapidity in the North-Eastern district. The fact may be very clearly shown by a few figures, and the citation need not be burdensome or long. The output of manufactured iron is thus indicated for specific periods in the half century and for the North-Eastern district approximately:—

Year.	Tons.	Year.	Tons.
1836.	about 50,000	1883.	700,000
1863.	340,000	1886.	350,000
1873.	670,000		

The declension in late years is mainly attributable to the change of the demand from iron to steel for rails and shipbuilding material. That declension has affected the number of works rolling iron, for whilst there were ten years ago 43 works in operation, that number had been reduced to 19 last year. There used to be, for instance, 320,000 tons of iron rails annually produced, but there are only 30,000 tons yearly now, whilst the output of iron plates has fallen as remarkably. This declension in the production of manufactured iron, and the manner in which it has been brought about, leads us to the consideration of the changes in the

STEEL MANUFACTURE.

In the North of England the steel trade dates far back, for three centuries ago Germans settled on the banks of the Derwent, and there established sword and edge-tool factories. But the industry passed into other phases, and fifty years ago it was carried on in more modern methods at Newburn and Derwentcote. We have no early records of the industry to enable its extent to be outlined; and it is chiefly in the last dozen years that the change in the demand for railway and shipbuilding

use has given to the North a prominent position in the steel manufacture. It is now one of the largest producing districts in the kingdom, alike for Bessemer and open-hearth steel, and for the latter its output is yearly increasing. By the Bessemer process, the North-East of England produced 326,000 tons of ingots in a year, and by the open-hearth system its yield last year was 124,100 tons, and such an upgrowth of industry in a dozen years must be looked on not only as a proof of the vitality of the district, but also as an indication of the tendency of the trade and of the kind of metal asked for by the users. Hence the decay in the demand for manufactured iron has to set against it a larger production of steel in the two forms now being substituted for the older form of the metal. Ebbs and flows in the price of malleable iron may alter the rate of decay of the latter, but the unmistakable preference has been shown for the newer forms of metal, and it will continue. And the vast steel works at Consett and at Eston are known to be marvels in the mechanical ingenuity displayed to lessen labour and to economise fuel.

SHIPBUILDING.

One of the industries of the North which is the most distinctive in its change, and which has had and still has the largest influence on the commercial prosperity of the North. Half a century ago it was carried on in miniature, and in its olden guise. The building of wooden vessels was carried on on the Tyne, the Wear, and the Tees, as well as at Hartlepool. Not till 1842 was the first iron vessel launched on the Tyne, and ten years elapsed before the Wear built its first vessel of iron. On the Tees, the first iron ship was built at South Stockton in 1854, and at West Hartlepool iron shipbuilding began in 1856. But wood and iron were used concurrently for years, and it was not till one-half the period had gone that the industry was established on a scale of any magnitude. In 1862, the iron vessels launched on the Tyne amounted to 32,175 tons only, or a tenth part of the output in some later years. But the records of the Tyne are incomplete as to the tonnage launched, and therefore all that can be done is to give a comparison of the output at the local ports for years in which reliable data are obtainable. The following statement will show the growth of the shipbuilding industry at some local ports over a period not without its difficulties, and in which there were in consequence many fluctuations:—

	1862.	1886.
Tyne	32,175 tons	82,760 tons.
Wear	15,608 tons	56,713 tons.
Tees	9,660 tons	20,476 tons.
West Hartlepool. 11,000 about	15,293 tons.
	68,443 tons175,242 tons.

Last year was, as far as the extent of the tonnage produced is concerned, the worst year known for a long period in the shipbuilding industry, yet it will be seen that the tonnage produced is much more than double that of a brisk year in an earlier decade. If the comparison were taken with the year 1884, the result would be still more surprising, for in that year 315,000 tons of vessels were launched at the four ports named. Last year one-half the pro-

ductive capacity was unemployed, so that the comparison is unfair to shipbuilding now. But the change is not alone in the volume of trade done; it is in its value, its kind, and its material. Fifty years ago wood was the invariable framework of our ships, and twenty-five years ago it lingered in use. Ten years ago iron was as invariably used, but now steel competes often, and it is probable that this year will see the newer form of metal occupying the preponderating position. It is only within recent years that steel has been largely used at the North-eastern ports, but in 1885 the tonnage of steel built vessels was larger than that of iron on the Tyne and also at West Hartlepool, whilst on the Wear it was a third of the iron tonnage, and on the Tees it attained respectable though smaller dimensions. In 1886 there were further advances, and in 1887 it is expected that the total of the North-eastern ports will be mainly steel. Wood is occasionally used for vessels for special purposes, and last year there were vessels built of this older material both on the Tyne and at Whitby. In other things than the material there has been change; the trade of the country in this particular has come more fully to the North-eastern ports, for fifty years ago there was only a limited construction on the three Northern rivers, whilst the bulk of the constructive operations in shipbuilding were carried out at other and more distant ports, some of which have almost ceased to compete with us. But there is another important change in the half-century in shipping, and that is the change from sailing vessels to steamships. Few departments of industry show more striking advances than that of

MARINE ENGINEERING.

In twenty years only out of the fifty, marine boilers have been altered much in design and in the pressure they have to bear. Pressures of from 20lbs. to 30lbs. have given place to pressures from 80lbs. to 180lbs.; the varieties of type have increased, and the old rectangular boiler is now little used, but the technical details need not be here dwelt upon. We have first to show the change in the method of propulsion, and to point out how the mercantile navy of this district has been gradually changing from one chiefly wind-impelled to one propelled by steam. A comparison of the vessels owned at two periods in the time under review will first of all indicate the nature of the change. In 1852, there were only 237 steamships owned at the Tyne, Wear, and Tees ports, and at the Hartlepools, but in thirty years the number had increased to 1,115. On the other hand, the sailing vessels fell numerically between 1852 and 1882 from 2,674, for the ports named, to 661. The tonnage statistics are interesting. In the first place, the steamships at the ports rose from 5,141 for the year 1852, to about 536,000 tons for 1882—an enormous growth, maintained in later years, as we shall find. But the sailing tonnage fell from 573,400 tons to about 183,000 tons. And there was more than this mere change in the gross tonnage. A larger class of ships became a demand of the Northern owners. An analysis, published in 1852, shows that in the whole North of England there

were only 56 vessels over 500 tons register, and three over 1,000 tons (all of them sailers), whereas in 1862 the numbers had risen to 136 over 500 tons, and seven over 1,000, and to these have to be added 11 steamers over 500 tons, and two over 1,000. The two steamers over 1,000 tons were the Rangoon, 1,333 tons, and the Malacca, 1,354, both the property of Mr. (now Sir) C. M. Palmer. It may be interesting to know that the only three vessels registered in the North as being over 1,000 tons in 1852 were the Hotspur, 1,142 tons, and the Gloriana, 1,056 tons, both the property of Messrs. T. and W. Smith, Newcastle, and the Coriolanus, 1,176 tons, belonging to Messrs. J. and J. Watts and Co., of North Shields. All were "merchantmen" well known to Tynesiders. As will be seen from a tabular statement below, the desire for ships of heavier burthen, which may be said to have commenced with the rush caused by the demands for carrying power during the Crimean war, and the subsequent development of commerce with the American Republic, steadily kept progress with the years :—

	1852.			
	Steamers.	Sailing.	500 tons	1,000 tons
	500 tons	1,000 tons	500 tons	1,000 tons
Newcastle	0	0	26	2
Sunderland	0	0	23	0
North Shields, and in which South Shields is in- cluded	0	0	7	1
Hartlepools	0	0	0	0
Totals	0	0	56	3
	1882.			
Newcastle	152	54	32	19
North Shields	82	34	18	1
South Shields	15	4	20	4
Sunderland	133	43	22	0
Hartlepools	139	47	0	0
Totals	521	182	92	24

In 1852 the great bulk of the steamers of the North were tug boats of from 8 to 30 tons each. Steam tonnage did not increase with great rapidity at the Northern ports in the first of the decades covered by the comparison above ; the chief enlargement began in the second of these periods of ten years, and continued down to a year or so ago, when the intense dulness in shipping checked the growth. It is noticeable the total tonnage of vessels at several of the ports had a check in growth in the years we have hinted at, and that the aggregate tonnage is not so much above that of thirty years ago as could have been expected, but this is because the steam tonnage is much more "effective" than sailing, and by it greatly increased cargo is carried. We give now a comparison of the tonnage held for the three first decades :—

Sailing and steamship and gross tonnage registered in the North-east ports :—

1852.

Port.	No. of Vessels.	No. of Sailing.	Total.	Total.
	Tonge.	Stmr.	Tonge.	Vessls.
Newcastle	736	155,562	118	2,583
Shields	628	155,260	58	1,333
Sunderland	1,044	213,817	32	598
Hartlepools	103	21,019	3	68
Stockton	163	27,751	26	559
Totals	2,674	573,409	237	5,141

Totals ... 2,674 573,409 237 5,141 2,911 578,550

	1882.
Newcastle	191
*No. Shields	135
So. Shields	72
Sunderland	202
Hartlepools	46
Middlesbro'	15
Whitby	115
Scarbro'	25
Totals	801

211,898 1,115 592,330 1,916 804,228
This comparison in decades is convenient, and we may now give the figures for a later year, dismissing the sailing vessels, which have still continued to dwindle :—

	Tons.
Tyne	329,090
Wear	202,319
West Hartlepool	204,871

736,280

It is difficult in dealing with the shipping industry to do more than name some of those who are its leaders. On the Tyne, the names of Palmer and Mitchell, of Leslie and Readhead are noted ; on the Wear, Laing and Doxford, with others, keep up the repute of that old river ; at West Hartlepool, Gray and Withy are prominent ; and on the Tees, Richardson at Stockton, and Dixon at Middlesbrough, lead the van. And it is well worth while referring to the completeness of one of the Tyne yards : not only is Palmer's Shipbuilding and Iron Company a builder of vessels, but it is also a marine engineering establishment, an iron smelter, a steel maker, a rolling mill owner, and also a mine owner. And it has thus built vessels for the world :—

PALMER'S SHIPPING OUTPUT.					
Year.	Tonnage.	Year.	Tonnage.	Year.	
1852	920	1864	22,896	1876	8,635
1853	3,539	1865	31,111	1877	16,235
1854	7,469	1866	18,973	1878	23,470
1855	5,169	1867	16,555	1879	36,080
1856	7,531	1868	15,842	1880	38,117
1857	6,816	1869	11,900	1881	50,192
1858	7,625	1870	26,129	1882	60,379
1859	11,894	1871	19,267	1883	61,113
1860	4,653	1872	12,810	1884	28,911
1861	4,751	1873	21,017	1885	25,057
1862	21,493	1874	25,057	1886	20,725
1863	17,096	1875	15,819		

Thus in less than half a century there has been an increase in the carrying capacity of the vessels at the North-eastern ports, and that to an enormous extent ; and it has been mainly brought about by a change from sailing to steam vessels. These returns are incomplete, for they only go back a portion of the half-century. For the United Kingdom, as a whole, we find that in 1840, out of 2,724,107 tons in the merchant navy, only 87,539 tons were steam vessels ; but now, out of about 7,250,000 tons, some 4,250,000 tons are steamers. And the work done by the steamers is as 40 to 47. These figures enable us to appreciate the fulness of the dependence on the work of steamships and the effect that the marine engine has had on the world's commerce. The use of steam, too, in the merchant navy through various machines, has lessened—not the number of men employed in the total, but the proportion of men to the tonnage. It was, in 1854, the first year for which we have the records, about 4·36 per 100 tons ; it is now under 2·80 per 100 tons.

Fifty years ago we shall find that marine engineering had attained comparative prominence : the Hawthorns, Hawks, Crawshay and Co., and Mr. T. D. Marshall having been engaged in the industry at that early time on the river Tyne. Now, on the Tyne there is full capacity to engine the steamers built there in the strongest time ; and on the Wear, at the Hartlepools, and on the Tees this branch of the engineering industry has attained high place alike in the history of the trade and in local industrial enterprise. Other changes in marine engineering press for notice : the development of the engine itself—the varied stages of the old "jet" engines, the compound surface condensing ones, the triple expansion, and that which is now under trial, the quadruple expansion engines—the use of steel for boilers, with the higher pressure therein, these are amongst the changes known. And as it was in 1837 that Ericsson and Smith brought out their experimental vessels with propellers, it is worthy the note that this year is the jubilee year of that instrument of propulsion.

THE LOCOMOTIVE.

But if the North-East of England has had interest and credit in the development of the marine engine, it has had more in railway engineering, for it is the home and the birthplace of the locomotive. Wylam, Killingworth, Newcastle, and Shildon are the spots where the locomotive has known the earliest of the stages of its growth. It is needless to discredit Trevethick, "the inventor of the locomotive," nor is it desirable to settle the claims of Hedley, of Stephenson, and of Hackworth to the credit of priority as to certain points in the invention. Out of the waggonway the railway sprang ; and from the Wylam engine of William Hedley in 1813, and those of Stephenson in 1814, there sprang the locomotive, in idea as we know it, but smaller, less weighty, less compact, less effective. Before 1837 the usefulness of the locomotive had been demonstrated : the Wylam and Killingworth engines were not only doing good work on colliery lines, but the Stockton and Darlington, the unfortunate Clarence, the Liverpool and Manchester, the Canterbury and Whitstable, the Whitby and Pickering, and other railways were open, and on them locomotive engines were doing good work. The first locomotive factory in the world had been established by Stephenson, Pease, and Richardson in South Street, Newcastle, the first repairing shed had been built at Shildon, and other works had been begun. As far as can be learned, our railway system fifty years ago was only a thirteenth part of the extent that it now is, and the passengers were numbered then by the thousand instead of by the hundreds of millions in a year. Here from the file of forty-seven years ago is the railway share list of that day, and it shows sparsely to that of to-day.

RAILWAYS.				
		Div.	Amt. Paid.	Price.
3,000	100	Newcastle and Carlisle,.....	4	100 0 104 10 0
2,400	50	Newcastle and North Shields,.....		50 0 50 0 0
2,400	50	Branding Junction,.....		50 0 50 0 0
1,500	100	Stanhope and Tyne,.....	5	100 0 100 0 0
2,000	100	Hartlepool Dock and Railway,.....		100 0 145 0 0
10,000	100	Great North of England,.....		65 0 0 0 0
25,000	100	London and Birmingham,.....	7	90 0 140 0 0

It is a curious fact that all the lines named have lost their name, and all but the last are now merged in the North-Eastern Railway Company. For some cause we are not able to discern the primal railway in the list, but it would have compared well with most of those included therein. Before coming to the railway system as a whole, the further remark may be made as to the locomotive, that fifty years ago its weight was about 8 tons—now the weight frequently exceeds 40 tons ; the gross load then was about 40 tons, now it is over 130 tons ; the speed was from 6 to 20 miles per hour, now it is nearer 60. Finally, fifty years ago there were probably 40 locomotives in work in this the parent district, but the North-Eastern Railway has alone, some 1,506 at work now. Fifty years ago, the railway system had begun its growth, but it was still limited to a few lines in coal countries, and near the sea as far as the North was concerned ; there sprang up in time in this locality vaster lines than the primal one from Stockton to Darlington, but at last the words of Robert Stephenson proved true : "Combination is possible," and competition was not probable long. So the Newcastle and Carlisle, the Stockton and Darlington, the West Hartlepool, the Cleveland, and others were all swallowed up by the great company formed by the amalgamation of the York, Newcastle, York and North Midland, and Leeds Northern lines ; and now from Newcastle to York, and from Saltburn to Tebey, all the lines, except two small companies, are merged in the great North-Eastern Railway. And that company, with its 1,537 miles of line, its capital of £60,061,000, its annual receipts of £6,250,000, and its capacity of carrying 37,000,000 passengers yearly—that line, undreamt of in its magnitude fifty years ago, is no unfit indication of the industrial development of this district in the period the jubilee covers. It is worth while citing here a fact which will be new to all readers, and which in itself shows the service that the railway system is to the North. We have already stated the number of passengers who travel on the North-Eastern system, but we may give now a fact of some local interest. During the year 1886, the following numbers of passengers were booked at the three railway stations in Newcastle—the numbers being, of course, exclusive of season ticket holders, and thus representing the persons who have paid for tickets in the year :—

	Passengers.
Newcastle—Central	2,089,977
Newcastle—Manors	236,092
Newcastle—New Bridge Street	180,735

The figures do not represent the persons using the stations, or arriving there ; nor do they represent the fulness of the work these stations have in busy seasons. On one day in June, twenty-four years ago, 35,343 persons arrived at and left the Central Station, and that number has since been more than once exceeded. And the Central Station is still a credit to the design of Mr. Dobson, and serves the nine or ten lines that there terminate just as well as it did when with great acclaim it was opened. Near to it in the High Level Bridge is another indication alike of railway enterprise and engineering genius, the bridge on which £491,153 was spent. It had been dreamt of before the rail-

way system, but it was long after the half century had been entered into that the bridge was brought into use ; and in that magnificent connexion between two counties there is a proof of the benefits that the railway system has conferred on the North. And although it is nearly sixty-two years since the opening of the first public railway in the district it forms a part of, there are worlds yet for the locomotive to conquer. This year a part of Northumberland is to be opened out by it ; upper Weardale has its extended line in contemplation, and there are dales which still need cheap communication with consuming centres, whilst some of the shipping ports of Durham complain of the scanty and circuitous communication they have with the coal districts ; so that large as has been the advance of the railway in a little more than threescore years, there remains much yet to be done by it.

ENGINEERING.

But marine engines and locomotives do not exhaust the productions of the Northern engineers. In 1747, the "Gateshead Iron Works" were begun, in 1809 the Walker Works, in 1817 the Forth Banks Engine Works, in 1847 the Elswick Engine Works, and others have followed that lead. In stationary steam engines the North has attained long ago high repute, whilst the production of winding and blowing engines has followed naturally the growth of the coal trade in the North ; whilst in hydraulic machinery and in the many machines needed on shipboard there has been an enlarged trade which is almost the concomitant of that activity in machine constructional works to which we have referred. In bridge building the district has been foremost since the time when Hawks, Crawshay, and Sons erected the High Level. In all parts of the world, almost, the bridges of this firm stand steadfast ; and not least remarkable in extent or in the rapidity with which it has been built is one of the later Indian viaducts from the noted Gateshead firm. Robert Stephenson and Co. have been bridge builders of note from the days when they built a memorable way over the Nile. Sir W. G. Armstrong and Co. (under the old title) were builders of many bridges—swing, draw, and fixed ; and at Middlesbrough and Darlington there has been turned out work of note in this class. One other branch of trade invites remark—that carried on at Elswick "Supplementary Arsenal."

THE ELSWICK WORKS.

Prior to 1845 Elswick was practically remote from Newcastle, its "works" unmade, its guns undreamt of, and its hydraulic machinery undesignated. There is in the outgrowth of the Elswick Ordnance and Engineering Works a telling testimony to the industrial change in Newcastle itself. Established in 1847, and occupying only a comparatively small space of ground, about the middle of the present extensive range of buildings, the progress of the place is a history of the introduction of hydraulic machinery into common use in industry. The application of water pressure as a motive power for machinery met with a very cold reception and

some amount of dogged opposition, but in time the value of the invention became too patent to be rejected, and was as warmly welcomed as it had been previously coolly received. In 1858 the ordnance department was added, and this gave a further need for extension, and now over seventy acres are occupied by the works, and there are yearly extensions, until a completeness is being attained which has no parallel in this country. But the story of the growth of works in which hydraulic engineering was cradled, in which gunnery has been greatly developed, and wherein 12,000 men are employed is too long to tell here.

LEAD MINING AND MANUFACTURE.

For generations, lead mining has been one of the most distinctive industries of the North. It is believed that some of the Northern lead districts were known to and worked by the Romans, and it is certain that four centuries ago lead mines in Northumberland were wrought. Allendale, Blanchland, Weardale, and Teesdale have mines that have been explored for centuries, and long before this century there were works of magnitude carried out, such as that of the Neut Force Level, with the intention of developing the lead mining district. Durham and Northumberland have long been extensive producers of lead ore and of lead, and much of the lead manufacture gravitated to the banks of the Tyne. In 1845, indeed, the Durham and Northumberland district produced not less than 10,248 tons of lead, and that comparatively large output was for years increased. In addition to this, the Tyne was the centre of the imported lead trade. The desilverising process of the late Mr. H. L. Pattinson, and the improvements of Dr. Richardson and of Mr. Burnett, drew the Spanish lead to this district, and thus whilst the imports of lead into the Tyne were only 213 tons in the year 1844, in less than twenty years they had risen to more than 12,000 tons, and they are now 30,000 tons. Thus, from the mines in the counties of Northumberland and Durham there are now drawn 16,300 tons of lead ore, in addition to large quantities just outside the borders of these counties. The lead obtained from these ores is supplemented by 18,000 tons of lead imported into the Tyne, so that there is a large quantity of raw material for the factories on the Tyne to work upon. More than a century ago, the manufacture of lead was commenced on the Tyne, and on its banks many are the tokens of the works for the manipulation and the desilverising of lead. Of white lead, red lead, litharge, sheet lead, piping, and shot, it is believed that over 30,000 tons are annually made at the Tyne works, and some of the processes for the production of pipes and of "lead fibre" are exceedingly ingenious, interesting, and delicate. In recent years there has been very little enlargement of the output of the lead mines of the North, but none the less is the trade one of great importance to the mining dales and to the river Tyne ; and the conditions under which it is carried on, as well as the thousands of dependents on it, give to this olden industry value and attraction. The rich leads from

other lands may interfere with the development of the mines of the North ; but there is still profit in some of these, and mines such as those of Allendale and Weardale have made fortunes for past proprietors, whilst others, such as the Green Hurth, have yielded them for owners in the present day.

THE CHEMICAL TRADE.

In the chemical trade we have an industry which, as far as the Tyne is concerned, is in an extensive phase, the outgrowth of a little less than a century. And if the story of the struggles of those who began it on this river could be told, it would be as interesting as a fairy tale ; but the Dundonalds, Loshes, and Doubledays have passed away, and few and scanty have been the records left. The first alkali works of note in the North were established about the year 1796, at Walker—the original partners being Lords Dundonald and Dundas, Messrs. Aubone and John Surtees, and John and William Losh. The works of Doubleday and Easterby, of Cookson, Allen, Attwood, Clapham, Pattinson, and others followed ; and "about 1816, Mr. Losh brought from Paris the present plan of decomposing sulphate of soda, which he immediately introduced into his works at Walker ;" and thus we have the father and the birthplace of the modern alkali trade in this country. It has been said that the site at Walker was chosen to utilise a salt spring there, and also that the salt there produced was free from duty as far as it was used for the manufacture of soda. Some sixty years ago the supply of salt began to be drawn from Cheshire, and thence the bulk of it was drawn until three years ago. In the last fifty years the chemical trade of the Tyne has known its largest growth, but the growth in the last decade has been arrested. Many of the old alkali works on the Tyne were begun in that period ; in it bleaching powder was first made on the Tyne,—at Walker, and by Losh, Wilson, and Bell, we believe ;—and just in it, the year 1838, pyrites were used as a substitute for Sicilian sulphur. In the period the adoption of the newer method of making bleaching powder has become general, and machinery is in some important particulars beginning to supersede hand labour. There has been a further change which is of much more importance, and to which we shall have to refer a little more at length. And there has been what may be called the consolidation of the industry into larger concerns—companies and firms—and, concurrently, the lessened waste of what were once bye-products. Another change that may affect it greatly is the utilisation of the salt deposits of South Durham. Hitherto, as we have remarked, salt has been procured mainly of late from Cheshire ; but the conditions of the trade would be greatly altered if an adequate supply were procurable in Durham. The change we have hinted at has forced upon the attention of the manufacturers economies of working—economies that have led to the introduction of mechanical furnaces—the Jones furnace at the Newcastle Chemical Works, the St. Bede furnace at East Jarrow, and the Mactear furnace at the works of Messrs. Tennant. Gradually the proportion of labour employed has been reduced, and the coal consumed is less, in proportion to the produce. As to that great change

in the manufacture in recent years, we may quote the words of that eminent authority, the late Mr. Walter Weldon, who said that for the "manufacture of soda by the Leblanc process, recent years have been years in many cases of loss, and, in not a few cases, of disaster." The cause has been the rapid growth of the ammonia soda manufacture. The production of soda by the newer process was trebled in three years in this country ; and as it is capable of being cheaper carried on than is that on the Tyne, the competition pressed so severely on the latter, that despite the economy observed many of the older alkali works on the Tyne have been crowded out of the trade. A remarkable expedient was had resort to a few years ago, which has been thus described in our columns :—Whilst the ammonia process has unquestionably the power to produce soda ash cheaper than the process common on the Tyne, there is produced by the Leblanc process what was a waste product, and what is now a most valuable product—bleaching powder, which is not yet producable by the ammonia process. As the latter mode of manufacture was slowly crushing out the former, it would have lessened the total yield of bleaching powder, but the makers by union decided to limit the extent of the yield of the latter, but at the same time to utilise the waste by commencing at the initial process, and there restricting the work. Concurrently with that attempt, and largely through it, the price of bleaching powder rose with such rapidity that from £4 per ton it shot up in a few months to over double that price, and though the full extent of the increase has not been maintained the price is still much above the figure named. Indeed, so remarkable has been the rise in price that it is said that instead of producing soda as the main product, and bleaching powder as the by-product, the latter is becoming the chief article sought, and the soda is now nearly a by-product ! A series of internal changes at the works has followed this combination—in some the production of soda ash has ceased, the crude product of sulphate being sold instead, and others have added to the make of the article that has risen in price, whilst the general production has been limited. Steps have also been taken to procure cheaper sulphur—another of the raw materials ; attempts have been made to use gas producers in place of coal fires ; and other changes in work have followed. In this time of transition, and when there is a large utilisation of the nearer salt deposits in South Durham, it is not very easy to indicate the result of these changes.

It is rather difficult to estimate the extent of the chemical trade on the Tyne, not only because official statistics of the industry have not been regularly compiled, but also because of the changes in the method of working and in the nature of the products. But there have been on two or three occasions statistics compiled which enable us to draw a comparison that will have interest. The best test of the condition—so far as extent of production is concerned—of the chemical trade as a whole, is the amount of the salt decomposed ; and we are able to give some figures from official sources which show the extent of that decomposition. For the year 1863—the first for which there is reliable data, the amount of salt yearly

decomposed was about 90,000 tons ; and it was increased year by year for at least a decade. In 1833, the amount of salt decomposed had risen to about 187,850 tons, and though it fluctuated a little afterwards, yet that amount may be taken as about the maximum. For 1833, there was an amount of salt decomposed which was less—it was in round numbers for that year 181,000 tons. Since that date, low prices of chemical products have driven some of those who were the makers out of the trade, and now the amount decomposed may be put at 125,000 tons yearly. The alkali works in the district have decreased in number : twenty-five or twenty-six were in operation a dozen years ago ; they were brought down to 12 in 1883, and now they number six or seven only, but these are of larger size, and a greater capacity. Of one article, we may give the figures which show the variation in the output during the half century : in 1833, about 3,300 tons of soda crystals were made ; in 1867, the production was about 86,000 tons yearly ; in 1882, the output was about 100,000 tons ; but it has been reduced slightly since that time. The soda trade is one which, as we have hinted, is in a transitional state, and it is difficult to say how it will emerge from the next year or two. One of the largest firms in the trade is about to produce caustic soda, and it is possible that the tendency will be to further lessen the output of either soda crystals or soda ash, or both.

SOUTH DURHAM SALT.

Foremost amongst the mineral industries is that of salt. It is now about a quarter of a century since, in boring for water, Messrs. Bolckow and Vaughan discovered at the Middlesbrough side of the river a bed of salt. The strata was bored through to the depth of 1,313 feet, and a bed of salt over 100 feet thick was found, the boring being commenced July 4th, 1859, and ceasing August 29th, 1862. In 1874 Messrs. Bell Brothers, at their (Port Clarence) side of the river, tested the strata by the Diamond Borer, and also discovered salt at a depth of 1,127 feet down to 1,222 feet. The existence of the bed being proved, arrangements were made later to utilise the discovery, and a bore hole was begun at Saltholme "Salt works" by Bell Brothers, which was finished in 1882. A somewhat similar depth proved that a thick bed of salt was present. The core being drawn, a tube 16 inches in diameter has been carried to the bottom of the bed of salt, the portion traversing the salt being pierced with holes. Inside this a second tube is placed, open at the lower end. "Water is run down the annulus formed by these two tubes, and, becoming saturated with salt, rises in the internal tube until it is balanced by the outer column of fresh water. The proportional weight of fresh water and brine is as 1,000 to 1,200, so that the inner column stands considerably below the outer. A pump is placed at the top of the inner column, and by this means the brine is raised to the surface." This method, which is extensively in use on the Continent, is now in operation at Port Clarence, and is making South Durham the centre of a new industry. It cannot fail to exercise an important influence on the soda manufacture carried on upon the banks of the Tyne, where thou-

sands of tons of salt are annually decomposed. Following Bell Brothers, the Newcastle Chemical Works Co., Charles Tennant and Partners (Limited), the Haverton Hill Salt Co., and others have begun to utilise the salt deposits of South Durham, and Bolckow and Vaughan are so doing at Middlesbrough and Eston. The bed of salt has been proved to be from 80 to 100 feet thick ; it is certain that it extends from Eston to Greatham, so that the vast area must support a large production for years. And now, with an output of possibly 3,000 tons weekly, there is a great future for the salt fields of South Durham. But in the last few months a newer method of boring—the American method—has been successfully tried, and by it, it is claimed, a quicker and cheaper boring is effected ; whilst it is certain that several bore-holes made by it are now adding to the yield of salt in Durham. That salt, moreover, finds an increasing sale for more uses than that in the chemical trade. Fisheries, agriculture, and export, as well as home household use, will extend the consumption yearly.

SUBSIDIARY INDUSTRIES.

There are other industries on the Tyne and in the north-eastern district—less in extent than those of coal and iron, but still important if subsidiary.

PAPER-MAKING.

There is that important industry of paper-making. Fifty years ago, according to the statement made by Mr. W. H. Richardson, and published in 1863, the extent of the manufacture of paper was estimated for the district at about 4,000 tons per annum ; the trade grew, and about 1860 there became more general the use of esparto, the production increased, and it was estimated for 1863 at about 8,000 tons. Then the import of esparto was only to the extent of 9,500 tons. Now the import into the Tyne apart from the Wear, is 21,000 tons annually ; and this statement of the import of what is now the chief raw material may be looked upon as the indication of the growth of the paper manufacture. It is in fewer hands than it was : the tendency of the age is to the concentration into a few large rather than many small establishments ; and thus at Hendon and Jarrow, as well as at the older centres of the trade, large works replace the small old ones of years ago. But it is a curious fact that the growth of the trade has had some relation to its price, for if in the period under notice the quantity of paper made has been very greatly increased, it has been by a reduction of the price in very large degree. Roughly speaking, paper is only one-half the price that it was a score of years ago. Recently an attempt has been made to introduce into South Durham, and that with some success, the production of paper pulp. But the paper manufacture of the North has not advanced concurrently with the consumption here, and thus we find that by sea and land there is a considerable import, the former being often to the extent of 2,250 tons yearly.

GLASS AND EARTHENWARE.

Glass is in the North an industry which is historic. Ordinary window glass was first used in Great Britain at monasteries on the Tyne and the Wear, and the first manufactory of window (crown)

glass in the country was established on the Tyne. Fifty years ago, six large works on the river made some 7,000,000 feet of window glass, but sheet and plate glass have thrown "crown" out of the market and closed these. The sheet and plate glass factories of the North have had in half a century a rapid growth, but it has not of late proved to be as fully enduring. The glass-bottle trade, also, has known of late some adversity in the district, and the 47 glass bottle houses which were a short time ago in this district have been thinned. Nor can it be said that the stained-glass trades, though the products are most beautiful, and the produce of the district noted, it cannot be said that there is much enlargement of the industry. Earthenware in the North-east maintains its own, but the advances even in half a century are slight when put into contrast with the greater trades we have named.

FIRE-CLAY GOODS.

In fire-clay goods we have a manufacture which finds its raw material in large quantities in the coal measures. In the year 1886 the production in Northumberland and Durham was to the extent of 450,000 tons. The trade in the manufactures from this material is not very ancient; and in the half-century it knew rapid increase in the earlier half, but it can scarcely be said that this remark would have application to the latter half. In 1838 some 7,000,000 fire-bricks were yearly made in the district; in 1863 the production was to the amount of 80,000,000, and large numbers of retorts are also produced. From 130,000 to 150,000 tons of fire-bricks and fire-clay goods are yearly sent from the Tyne, but it cannot be concealed that the trade has suffered from the imposition of very heavy duties imposed on its productions when entering Germany and other countries. The effect of these duties has been not exactly to shut out our productions, but to lessen the use, and though some attempt has been made to find out new markets, yet the loss of the demand from Germany has been felt by many makers.

CEMENT.

Cement is a trade specially carried on in the North. It does not date much further back, on any scale of magnitude than thirty years, and it has also of late been tending into fewer and larger works, but on the Tyne and the Wear, as well as at Hartlepool and West Hartlepool, there are works of magnitude, the outgrowth of the period we have named. The recent attempt to introduce the manufacture of slag cement on the river Tees need not be much noticed, for it can scarcely be said to be more than in the experimental stage.

WIRE ROPE.

Another and an interesting industry is that of wire rope. The history of one firm may very fittingly illustrate this peculiar industry, which has grown and is growing out of the older rope manufacture—the amalgamation of the rope-making firms of Messrs. Dixon and Corbitt, and Messrs. R. S. Newall and Co., in the hemp and wire rope trades. Their works are situate at the Teams, and adjoin each other, and consequently will be easily managed jointly at greatly reduced cost. We understand that after several years of litigation Mr.

Newall has retired from the business, his interest having been purchased by his partners, hence the present arrangement. The tendency of the times is to produce everything in large quantities and by that means to reduce cost. Such are the advantages anticipated by the present amalgamation, and no doubt, from our knowledge of the antecedent and present management, the arrangement will be a beneficial one in many ways. Looking back forty-five years ago, when these works were commenced on a very small scale, and with crude mechanical appliances such as were in use at that time for making of rope, and comparing them with their present huge dimensions and the beautiful mechanism now in operation, it is marvellous to notice the transformation that has taken place. It can scarcely be wondered that success should have followed such enterprise and talent as has been brought to bear in the production of such improved appliances. The wire rope making process is a most interesting one, and commences with tiny machines spinning wires as small as the finest hair, and gradually rising to that of gigantic proportions turning out immense cables from the usual cylindrical wire on the original Newall patent entwisted system, the later patent system of Lang, and the more recent Laidler's patent form of rope from sector-shaped wires, which gives a smooth surface to the strands, greater surface to friction and increased strength for the same diameter. The hemp process is by far the most astonishing, and must have taxed the inventive minds of Messrs. Dixon and Corbitt to bring it to its present state of perfection. The enormous amount of machinery employed in this department would surprise anyone unacquainted with the business; and although there is much of it by the very best makers of the day, with all the latest patent improvements, there are besides a number of special designed machines which have been constructed at the works. The machinery for the preparation of the various fibres, which comprise flax such as is used in the linen trade and hemp of the various grades up to that of Manilla 7 to 8 feet in length, is manipulated with such perfect mechanism that when the fibres leave the machines in what is termed "slivers," it is characterised by its evenness and fineness of finish, ready for passing on to the spinning frames from which the yarn is turned off in thousands of bobbins, being straight and smooth, and consequently giving strength and uniformity throughout the rope. Hemp rope making has, until very recent date, been associated with a rope walk, but this entirely disappears at the Teams Works; and it is probable that the operation of making rope, cords, and twine under one roof can be seen in no other establishment in which so small a space is occupied and giving out such an immense output. The system employed is what may be termed an improvement of Huddart's, by which almost any length can be produced without any variation of angle of lay, and, therefore, obviates the disadvantages of the rope walk system, besides having the advantage of employing female instead of male labour, concentrated efficient control of the workpeople and materials, and consequently greatly diminished cost of production. Associated with the rope-making

business is that of making all kinds of lubricated plaited packings for engine purposes, made either round or square in section, and from asbestos, as well as other fibrous materials. The machinery used for plaiting is of entirely different design from that employed in rope-making, and attracts attention by the peculiar advancing and receding motion given to the spindles. Another very interesting branch is that of insulating wires and cables for electrical purposes. Dynamo and other coil wires are covered spirally with silk and cotton thread, and electric light cables with india-rubber, and afterwards braided with yarn and tarred. Rope-making has long been an important industry on Tyneside, and we may claim having laid the foundation of that of wire. We therefore look upon the amalgamation of these two businesses as an important event; and there can be no doubt that a large measure of success will attend the efforts of these gentlemen who are associated with the company, and who have so long and so ably conducted the same.

FISHERIES.

Not one of the least of the industries of the North is that which is pursued on the sea, but it is one of which we have no exact details. For the largest part of the half-century it has been carried on on our coasts in the manner in which it has been for thousands of years before. The exact extent of the fisheries on the North-east coast fifty years ago cannot be stated: all the references we have are such as the statement that Whitby was "a great fishing town," that Hartlepool was so noted that Scott paints one family in Northumberland as obtaining the "best of fish from Hartlepool," and that Cullercoats and many places on the coast of Northumberland were fishing stations of importance. But the area of the distribution of fish was circumscribed then, now it is wide. And thus we have in the half-century a transition still progressing, which is making fishery a more exact industry. The following figures show the increase in the fish carried on the North-Eastern Railway:—

Year 1882	47,421 tons	Year 1885	48,062 tons
" 1883	40,735 tons	" 1886	50,207 tons
" 1884	48,482 tons		

But there is room for enormous growth in this ancient industry.

There are other industries in the North—tanning, hat making, timber, the provision trade, and others large enough to have justified longer notice did space permit.

OUR PORTS.

THE TYNE.

The trade of the north-east is fostered, increased, and developed by the improvements made and making in the rivers and ports. Dr. Bruce has recognised this when he said that it is to the Tyne that Newcastle "owes a large measure of its prosperity." But the trade that comes to the Tyne gives in degree reciprocal benefit to the river, and river and town share in those benefits. Trade to the ports has changed of late years, and it is only as these ports are able to accommodate the larger

steamers which now do so much of the carrying trade of the world that they are able to enlarge their commerce. In the last half century, the ports of the North have been greatly changed in this respect, and none more so than the Tyne. In that period there have been opened in the river the Tyne Dock, the Northumberland Dock, and the Albert Edward Dock; river walls have been built; and the vast pier works have been proceeded with rapidly. Dredging works on a scale almost unexampled for magnitude have been carried out—in 1838 the "old dredger" began its work, and in that year there were 21,579 tons of dredging performed. In 1841 there were 14,515 tons only; but there was a rapid though not unbroken increase after that date. In 1857 the work done needed six figures, and in 1862 there was removed not less a quantity than 1,864,544 tons of material. Even after that, the quantity increased, and in 1866 there was removed not less than 5,273,585 tons—one dredger alone, No. 6, removing more than a fourth of the total. And in the half-century there has been dredging work done to an amount between 70,000,000 and 80,000,000 tons—a work which has in no small degree helped to make the Tyne what it is as a river. As a result, there has not been a larger number of vessels, but the tonnage of the vessels increased by millions of tons—the increase from 1854 to 1876 alone being 5,297,029 vessels cleared out of the river. The tonnage of the vessels frequenting the river has increased also on the average—it was less than 150 tons in the year 1854; it reached 285 tons in 1874; and it is now about 430 tons. Moreover, the vessels coming to the port have changed from sailing vessels to steamers. So late as 1862, about four-fifths of the vessels were sailing ships, but in 1875 the steam tonnage formed more than one-half of the total; and, as is well known, there is a continuing growth of the steamer at the expense of the older ships. Trades have fluctuated in the Tyne, but in the total there has been a wonderful enlargement. Fifty years ago there is no record of an iron ore trade, though occasional cargoes were received from the North Yorkshire coast. In 1876 there were 175,000 tons brought into the river, but now the quantity varies from 380,000 tons to 440,000 tons yearly. The sulphur ore trade is the outgrowth of less than forty years, and 120,000 tons yearly are often now brought in. The timber trade has been enlarged—imports were 72,000 loads in the year 1863; they are now frequently as high as 260,000 loads yearly. And thus through many articles it might be shown that the details of trade have been changing, and that the relative rate of progress has been different, but that on the whole, and over a period of years, there has been a growth in the import trade that is marvellous. As to the export, it is sufficient to instance that which is the chief and the oldest of the cargoes from the Tyne. In the year 1839 there were shipped coastwise from the Tyne 2,149,814 tons of coal; in 1886 there were over 3,300,000 tons—the trade of Blyth not being included in the latter year. But the exports showed the larger increase:—In 1839 the exports from Newcastle were 543,846 tons only,

but in the year 1836 the exports had increased to 5,000,000 tons. Apart from the bunker coals needed, and without taking count of the non-inclusion of the small port now, it is evident that in 1836 the total shipments of coals from the Tyne were 5,600,000 tons more than they were in the earlier year we have named. Whether in the later years the ratio of increase has been kept up we need not now stop to inquire. Of the Tyne and its works the opinion of Mr. Clark Russell may be given:—"The Tynesider has a right to be proud of his noble stream," and to the future of "a people who in a few years have converted a worthless stream into a spacious river, who have raised its revenue from £19,000 to over a quarter of a million," whose "registered tonnage of vessels cleared in a twelve month is six millions, and whose shipbuilding and manufactures swell into larger and more astonishing figures month by month and year by year, he would be a bold man who should venture to predict a limit." The following shows in tabular form the growth of Tyne outward trade. The number, tonnage, and average size of vessels cleared from the river, in the years below, was:—

Year.	Number of Vessels.	Tonnage.	Average Size of Vessels.
1854	19,096	2,849,680	149 $\frac{1}{2}$
1855	18,152	2,791,371	154
1856	18,546	2,898,453	156 $\frac{1}{2}$
1857	19,449	3,064,040	158
1858	19,190	3,001,800	156 $\frac{1}{2}$
1859	18,823	3,060,145	163
1860	18,990	3,120,265	164 $\frac{1}{2}$
1861	19,371	3,196,781	165
1862	19,336	3,171,145	164
1863	18,858	3,213,375	170 $\frac{1}{2}$
1864	18,410	3,491,948	190
1865	19,663	4,037,422	205 $\frac{1}{2}$
1866	19,416	4,171,538	214 $\frac{1}{2}$
1867	18,949	4,221,852	222
1868	18,910	4,076,084	215 $\frac{1}{2}$
1869	18,428	4,166,922	226
1870	19,102	4,574,565	239
1871	18,956	4,879,878	—
1872	19,101	4,885,412	267
1873	16,799	4,611,358	274
1885	14,253	6,105,932	428

THE WEAR.

Few places have made more out of a stream narrow as the Wear than Sunderland. In the official statements of the River Wear Commission we have facts which enable us to show at once the rate of growth of its trade. In the year 1836 there were 1,155,414 tons of coals shipped in the port; in 1840 the North Dock was opened; and in 1850 the South Dock; whilst in 1856 the South Outlet was opened. Starting from the shipment of coals named, we find that there was an output from the port of over 2,200,000 tons in the year we have last referred to. In 1861 three million tons were exceeded; and finally, in 1886 there was the largest shipment in the history of the port, with one exception, the quantity sent out being 3,945,434 tons. The imports of timber and props are large, and increasing; and of ore, grain, and chalk there is a steady and recently-increasing trade. Finally, the picture of Mr. Clark Russell may, in a sentence or two, sum up what is needful to add to the facts already stated: on the river you "realise all

the significance of this humming, hammering, tumultuous smoke-shrouded district," and on that river there are "five miles of continuous works." You "see the yards, the factories, the works; you hear the harsh roar of the giant Labour," but now there is not "every yard crowded with fabrics in course of construction," but still great is the Wear as an industrial river.

THE HARTLEPOOLS.

Down to the year 1844, we have no specific statement of the trade of Hartlepool, which was then included in the returns for the port of Stockton. West Hartlepool was not then created. In the year 1845, Hartlepool sent out 834,408 tons of coals, and as the new town to the west began its development under Mr. Ralph Ward Jackson, the trade of the port grew, and by the year 1859 more than two million tons were shipped. But that quantity has not been kept up, and thus for the year 1886 the total shipment of coals coastwise and for export was 1,038,000 tons. But in the formation in fifty years of docks and basins to the extent of 200 acres, in three graving docks, in grain warehouses covering 4 $\frac{1}{2}$ acres of ground, in the creation of a timber trade the largest on the North-east coast, there is much that is of value in the development of the industries of the North. A flourishing town has risen on a sandy coast; its trade facilities are large; its steamships are more powerful than those of any other North-eastern port except the Tyne; and in shipyards, engine works, docks, and mills it has the potentialities of a vast and a growing trade if it were true to itself.

THE TEES.

Fifty years ago the Tees had in one or two respects a fuller trade than it now has. It shipped in 1836 not less than 953,382 tons of coals, but it has found it better to use the fuel in its furnaces and forges; and thus last year the total shipment, home and foreign, of coal from the Tees was 56,000 tons. But it has cultivated a trade in iron such as no other river in the world has; and to fit the river for the trade a series of works have been carried out, which have few rivals in modern times. Fifty years ago, there was no dock in the Tees. The Middlesbrough owners provided one in 1842, and this has required more than once enlarging, and is now undergoing improvement. There were three or four channels from Middlesbrough to the sea half a century ago—channels shifting and shallow. Slag walls and other methods have defined the stream; dredging has deepened it, huge scarpers have been blasted, and one great breakwater has been constructed, whilst another is in course of construction now. Where there were 3 feet of water at low water of spring tides, there are 18 feet now; some 10,000,000 tons of dredging have been effected; and the revenue of the river has in the last thirty years risen from £4,000 to £55,000. Fifty years ago there was scarcely a ton of iron sent from the port, now there are a million tons sent in some years. It is a little more than half a century ago since the first vessel was built at Middlesbrough—a vessel described as "of about 300 tons, from the building yard of Mr. Laing," in 1833, but on that river and at the same place many noble vessels are now yearly

built. And judged by its trade, and by the clusters of works from Stockton to Eston, those who have had the Tees in charge have well done their duty to the stream, and the results justify them.

CONSETT.

Prominent amongst the inland places which are the upgrowth of the half century is that huge coal and iron producing establishment at Consett, which has built up towns and revived decaying villages in and near the Derwent Valley. It is not quite fifty years since the establishment of the Consett Iron Works. The prevalent but incorrect belief is that the late Mr. Jonathan Richardson commenced the works ; but he himself has stated that "the establishment of ironworks at Consett did not originate with" him, but with gentlemen with whom he was in no way connected. In 1840, Mr. Jonathan Richardson let to these gentlemen minerals on the Consett estate ; a private partnership was formed, and the works grew with a rapidity very uncommon. In 1848, the pay to the workmen, for one week, reached £4,200—the establishment being then the largest of its kind, with one exception, in the kingdom. In 1849 the company sought for iron-stone in Cleveland, and ultimately it acquired mines of its own there. In 1859, the collapse came, after which the "Derwent and Consett Iron Company" became the owners for a few troublous years ; and in April, 1864, the present Consett Iron Company acquired the works, and the career of prosperity unexampled in the history of the trade was begun. How it has prospered most people in the North know—in one year alone, the profits were much more than the sum paid for the works nine years previously ; and it may be sufficient to say that it paid for years more than 10 per cent. per annum, carried large amounts to rebuild, extend, and improve the works ; and that now its shares, £7 10s. paid, are selling at over £18. The change it has wrought in its vast district are evident to the passer-by. In 1831 Benfieldside had 534 inhabitants only ; in 1871 it had 4,434. Consett itself had only 146 inhabitants in 1831, but by 1871 it had 5,982, and in 1881 the number was 6,746. But the trace of the effect of the Consett Works is not in one place alone, it is to be found along the Derwent Valley, in coke-making and coal-raising villages, as well as in the great towns which are most immediately connected with the production of steel and iron. That enlarged population has had needs of local government and of local institutions supplied, and the whole of the Consett district marks a change such as few places do.

JARROW AND OTHER TOWNS.

It would be easy to point out the growth of Jarrow and other towns. Fifty years ago, Jarrow had a memory, and little more. The shade of the venerable Bede hung over it ; and the ruins of his monastery were soot-covered and dull-looking on the Slake. By the efforts of the Palmers and of the company their name is given to, the place has become a town of moment, influential in shipbuilding, famed for its engine works, with a vast population, with Corporation, institute, and most of the essentials of town life. There was no population worth

naming half a century ago, but in that time a town of from 20,000 to 30,000 people has sprung into life. If we go to the place whence Jarrow obtains its ironstone we shall find that Skinningrove, near it, has become a populous village instead of a hamlet of a dozen cottages, that Skelton is now a town ; that Saltburn has sprung into life, with the desire to rival Scarborough ; that Redcar is more than trebled in population : that in the west, Crook and many another place has grown into the similitude of a town ; and that valleys have been opened up for the coal, whilst in many a spot that trade has been planted which, when begun by the late Mr. Joseph Pease, with a dozen coke-ovens, caused his partners to shake their heads in dismay at the possibility of a failure. It is needless, however, to dilate on that upgrowth of centres of the iron, coal, and allied trades—it is an upgrowth which is sufficiently indicated by the enlargement of the population of the district.

POPULATION.

We have already some instances of the effect of the industrial growth on the population, but it may be of interest to give also a table showing the general result. Here, then, are pregnant figures as to Northumberland, Durham, and the North Riding of Yorkshire, showing the population at two periods :—

	1831.	1881.
Durham.....	239,256	875,507
Northumberland.....	236,959	434,024
North Yorkshire.....	190,800	268,034
	667,015	1,577,565

That increase of population has chiefly been in the mining and manufacturing districts, for there are dales and large areas where in a long period the total population has decreased. But in the large towns, in the mining centres, and in the metallurgical district there have been enlargements of the population such as are remarkable. If we only look back from 1831 to 1851 we shall find that the population of Newcastle had doubled, and that Gateshead had nearly doubled in the last twenty of these years. Middlesbrough, again, added a thousand to its population in each of the first fifty years of its life ; and the same for a shorter period is correct as regards West Hartlepool and Jarrow.

THE GENERAL RESULTS.

Thus, then, there is outlined the changes which have been marked in some of the chief industries of the North-East in half a century. The accompanying and resultant changes have been as great, if not greater. Population has increased in, and has also been drawn from other parts to this district ; houses have been multiplied, imports and exports have been wonderfully enlarged ; trade has found new outlets ; and the enlarging wealth has found fresh investments. Figures do not tell the whole tale of the changes, but they do shadow it forth ; and it may enable general conclusions to be drawn if in passing, and in summarising we notice some of these changes. First, then, let us notice that in 1839 the ports from Tyne to Tees inclusive shipped

coastwise and foreign about 5,500,000 tons of coals, but last year these same ports sent out more than 14,600,000 tons of coals. In the method of shipment and of carriage by sea there is not the improvement in method that there might have been expected, but the quantity sent from the ports (if coal for bunkers be added) has been trebled in rather less than half a century, and this is fairly rapid growth. Practically we shipped neither coke nor iron fifty years ago. It is needless to quote the figures which prove how greatly the exports of these have been enlarged, but it may be said that a quarter of a million tons of coke are yearly exported from the Tyne alone. It has been computed that the steamships of the rivers Tyne and Wear and the port of West Hartlepool have a normal value of over £15,000,000. It has also been stated that the blast furnaces of the North-Eastern district have invested in them £3,000,000; and in forges and rolling mills there was at least as large an amount of capital sunk, though it is now depreciating fast. In one colliery-sinking alone above a quarter of a million sterling was spent; and though the exact cost of the pits which have been undertaken in the past five decades in the northern counties cannot be exactly recorded, it is a certainty that there has been spent a sum of money numbered only by millions. It is impossible to estimate even the sums which have been expended in providing the factories, the mills, the houses that find employment, essentials, and homes for the growing population of the North-East. Furnaces are feeding on the coal and limestone of Durham, in smelting the ores of Cleveland or Spain; under thousands of acres the miners are extracting coal; and 14,000 coke ovens are fitting that coal for use in the blast-furnace or the foundry. To and from the Tyne 9,000 steam ships and 5,000 sailing vessels bring and carry cargoes; and in like proportions to the smaller but still important places near. And in the briskest period of the trade, there, at the ports from Blyth to Whitby, one vessel was built for every day in the year. Round these great industries of iron, coal, and shipbuilding, others, contributory and large, are gathered; and thus there is in the course of a few years an industrial development, which, for variety and for extent, will probably find no equal in this country in the same interval.

It would be interesting to trace the causes of the change in the extent of towns, did space permit. In Newcastle, unquestionably the Elswick Works have had the greatest effect in the half century. They have peopled what was a solitude, for within that period there were only two or three houses in Scotswood Road; in that period "Rye Hill" was described as a new suburb of Newcastle, and the long range of streets that reach to near Benwell have been built. On the Wear, the docks of "King Hudson" and the upgrowth of iron shipbuilding yards "made" Sunderland. Iron has rejuvenated the old, and created a new and larger town on the Tees; and coal, timber, and general goods have built up West Hartlepool. Crook owes its position to the coke trade; Darlington has chiefly benefited through the railway system; Seaham Harbour was pluckily hewn out of a rock by the Marquis of Londonderry; Jarrow has shipbuilding to thank; and so

on through the list of towns that the half century has studded in this district.

And it may not be unfitting to quote from an address by Sir Frederick Abel on the work of the Imperial Institute, in which he refers to that new industry which has sprung from the discovery of Mr. Perkin thirty years ago. Sir Frederick says:—"In endeavouring to furnish some idea of the magnitude of the coal-tar industry, I may state that the total value of the coal-tar colours produced in 1885 amounted to £3,500,000. The value of alizarine and its related dyes which are used with it for obtaining various shades of colour now amounts to about one-half of the total produce of the coal-tar colour industry. Their manufacture in England in considerable quantities still continues, but it is a suggestive fact that the value of the artificial alizarine imported into this country from the Continent last year was £259,795. Taking the average value of madder at 5d. per lb., and the cost of its equivalent in artificial alizarine at one halfpenny, the quantity imported, if valued at 5d. per lb., would represent about £2,597,950." And Professor Hofman says as to these facts:—"If coal be destined sooner or later to supersede, as the primary source of colour, all the costly dyewoods hitherto consumed in the ornamentation of textile fabrics; if this singular chemical revolution, so far from being at all remote, is at this moment in the very act and process of gradual accomplishment; are we not on the eve of profound modifications in the commercial relations between the great colour-consuming and colour-producing regions of the globe? Eventualities, which it would be presumptuous to predict as certain, it may be permissible and prudent to forecast as probable; and there is fair reason to believe it probable that, before the period of another decennial Exhibition shall arrive, England will have learnt to depend, for the materials of the colours she so largely employs, mainly, if not wholly, on her own fossil stores. Indeed, to the chemical mind it cannot be doubtful that in the coal beneath her feet lie waiting to be drawn forth, even as the statue lies waiting in the quarry, the fossil equivalents of the long series of costly dye materials for which she has hitherto remained the tributary of foreign climes. Instead of disbursing her annual millions for these substances, England will beyond question, at no distant day, become herself the greatest colour-producing country in the world; nay, by the strangest of revolutions, she may ere long send her coal-derived blues to indigo-growing India, her tar-distilled crimson to cochineal-producing Mexico, and her fossil substitutes for quercitron and safflower to China, Japan, and the other countries whence these articles are now derived."

And it is to be remembered that the growth touched upon—a growth supplemented by a vast accretion in the retail trades—is not that of one on an industry just commencing. As we have seen, there were industries of moment in the North fifty years ago. Our coal was the fountain which supplied this country; our chemical makers were first in the field, and the largest suppliers of some of the chemical products; and our locomotive builders had the whole trade of the world in their hands, though they have not retained it. Our

industrial growth is, therefore, upon a past growth. But the fact must not be overlooked, if the picture is to be a fair one, that in the half century it has not been all growth. The needs of one age give place to the needs of another ; and those who supply later requirements often need later and different industries. The iron steamship does away with the wooden vessel, and carpenters, sailmakers, and others have to find new trades, or to depart to other parts. The salt which was so plentifully evaporated once at great cost on the banks of the Tyne, found a successful competitor in the Cheshire salt, cheaper made, and in turn in this district this is giving place to the salt in the nearer beds of South Durham.

DECAYING INDUSTRIES.

So far we have touched on many points of progress in the North-east in fifty years ; but it must not be forgotten that there are trades which have decayed and are decaying in that time. There is no search now, and practically no production, of the ironstone of the coal measures ; the iron ores of the mountain limestone are neglected ; lead mining in the dales of Durham and Northumberland is not carried on so fully as it once was ; copper mining had died out in some of its few northern centres ; the manufacture of tools and cutlery has disappeared from the district, and that of files is nearly gone ; salt, which consumed in 1727 on the Tyne so much coal that Defoe saw it ascend in clouds "over the hills, four miles before we came to Durham"—salt, the production of which a century ago caused the use on the Tyne of 130 salt pants—that trade has died out. There were starch mills on the Leazes in 1702, which lingered years after, but which have long ago moved to other centres. The horse-shoe nail trade was once almost the stay of Winlaton, and it is all but extinct now. The chain, cable, and anchor trade is dwindled on the Tyne, and is practically extinct on the Wear ; but thirty years ago one firm alone at Gateshead employed 350 men in that branch of their trade. A "Newcastle grindstone" is less common now than it was. The bottle trade was both large and important on the Tyne, and it is now there defunct. In glass, as we have said, there has been the decay of one section of the trade ; and others are not so vigorous as they were. Copperas is no longer the manufacture it was. The manufactured iron trade, across the whole region from the Tyne to the Tees, has felt a blow that, if not mortal, is at any rate of a serious nature. The keelmen of Newcastle were, if "rough untutored men," numerous and often influential, but they have gone, like Keats's lover, "into the ruin" of the past. Fifty years ago sedan chairs were numerous ; the pack-horse is no longer known in the lead-mining districts ; and many and various have been the smaller industries which have passed out of the ranks of labour employers in the half-century. And there is our greatest industry—agriculture—which has known such competition that it has now a dulness and depression, and a loss connected with it that it can scarcely be considered to have either the fulness, the extent, or the area of what it had fifty years ago, whilst profit has for the time disappeared.

FAILURES.

If there has been success, it has not been without failures serious and heavy. In railways, the Stockton and Hartlepool Company "never declared a dividend at all." The Stanhope paid no dividend, and the West Durham for many years was unremunerative. The collapse of the West Hartlepool Harbour and Railway Company, and the unfortunate position of one of its predecessors, the Clarence, and one of its allies, the Cleveland, are well-known. In banks, many have "gone under ingloriously." "The Newcastle Bank," says Dr. Bruce, "went in 1846." The North of England in 1847 ; the Union fell in the same year ; and finally the Northumberland and Durham District "stopped payment on Tuesday, the 26th November, 1857," and terrible were the results in the North. Old shipping companies at the ports from the Tyne to Whitby fell at various periods ; corn mills ceased to grind. In July, 1866, Pile, Spence, and Co., Limited, suspended payment. The purgation that Cleveland passed through ten years ago—when the amount of debts of firms and companies in the iron trade who failed was millions—is well-known. Colliery companies have been shorn of their number, and shipping is the latest industry which has had to be purged from the results of unhealthy trading.

HALF-A-CENTURY'S CHANGE.

Let us now glance rapidly at some of the evidences of change in industrial matters in the fifty years. The file of the *Newcastle Chronicle* of half-a-century ago is a rich mine of information, and there is scarcely a page but does not tell the story of how "down the ringing grooves of change" we have come into the fuller day. An advertisement tells us that the Newcastle and Carlisle Railway ran, half-a-century ago, "the steamboat *Swan* from the offices of the Company, 66, The Close, to Redheugh," three or four times daily ; and it adds also that goods are charged £1 1s. per ton between Newcastle and Carlisle. The Newcastle and Alnwick coach, "The Wonder," was running then ; the Brandling Junction Railway were advertising for "3 locomotive engines" ; a "direct coach to Liverpool" left the Turf Hotel at 4 p.m., and arrived at Liverpool at 11:30 next morning. The Great North of England, Clarence, and Hartlepool Junction Railway was just being formed—and that railway, one of the shortest in length and longest in name, endures till to-day, leased to the North-Eastern. The Newcastle and North Shields Railway wanted tenders for "sleepers, 8 feet long." The Newcastle Races were to be held on the Town Moor, and the great "event" of the North is thus described : "Northumberland Plate of 100 sovereigns." The Sunderland Joint-Stock Banking Company had just been formed ; and the Message of the President of the United States, dated 6th December, was published on the 7th of January. Finally, the *Newcastle Chronicle* of that day was a four-page paper, "price fourpence halfpenny." We have no information as to the circulation of newspapers in those days in Newcastle, but the whole of the newspapers issued in Northumberland a few years

later issued in one year only 538,750 copies ! Half-a-century ago teetotalism was not quite unknown, but little known ; there were no Post Office banks, and few savings banks, whilst many of the essentials of modern thrift and provision for casualty were undreamt of. At the beginning of that period, we should find George Stephenson beginning the construction of the Grand Junction Railway and of the North Midland ; Robert Stephenson and Brunel were contending over many a scheme ; the Duke of Cleveland was opposing the Barnard Castle and Darlington Railway ; Joseph Pease was in Parliament, supporting Hume, Clarkson, and others of the economical-philanthropic party ; Henry Bolckow was a corn merchant at Newcastle, and his after-partner manager of works at Walker ; Sir Charles Palmer was a schoolboy ; and thus through the roll of the men who have made towns and districts the record of change might run. A little over fifty years ago Newcastle gas was stored in gasometers in Manor Place and Forth Street, capable of holding only 60,000 cubic feet, and the price was "10s. per 1,000 cubic feet." It was then boasted that there were "about 600 streets, lanes, chares, and courts" in Newcastle ; there are now not less than 1,300, but it must be remembered that many little courts, alleys, or chares have been swept away, to make room for one wide street or road ; but if the town has increased, so has its pauperism, for in the four poorhouses of the parishes there were usually less than 200 paupers. There was another poorhouse "near the head of Gallowgate" kept for Coxbridge and five other parishes "outside the town"—Westgate, Byker, Elswick, Kenton, Jesmond, and Coxbridge, and this was kept by Mr. John Mason, who "kept the inmates at a weekly cost of about 3s. per week." A singular fact in regard to the growth of the North may be stated : it uses now twelve times as much of certain articles of food as it did fifty years ago. The figures below are from reliable data, and they apply to the whole of Northumberland and Durham. The population in those two counties consumed at the two dates given the following quantities :—

	1831.	1881.
Sugar, lbs.	8,571,870	91,637,100
Tea, oz.	8,648,085	98,212,750

This increase is in part due to the large increase in the population, but still more to the larger growth in the consumption, stimulated by cheapness.

AGRICULTURE.

We have said that one great industry is depressed, dull, and unprofitable. That industry is the greatest in our land—agriculture ; and it is to be regretted that in the north-east, coal has absorbed some of the attention which should be devoted to corn. There is an old poem of Ernest Jones's, which summarises the situation :—

Thinner wanes the rural village,
Smokier lies the fallow plain ;
Shrinks the corn fields pleasant tillage,
Fades the orchard's rich domain.

The acreage under wheat is shown by Sir James Caird to have fallen seriously off in recent years ;

the price has fallen ; and now partly because of these causes, and partly also because in this district we have given so much of our strength to mining and metallurgy, we have of necessity to import much wheat. Northumberland and Durham have a population of over 1,300,000 ; and in addition to the wheat grown in the counties, large quantities have to be brought in by sea from the Continent, from America, and from India. There, land is held cheaper than here ; the farmers often "own the land they till," and with the cheap carriage that the steamship has afforded, it has been impossible for our farmers to compete with their rivals abroad. Much of the statement that applies to wheat applies also to cattle, to dairy produce, and to fruit. And it is in the depression in this great and controlling industry that much of the cause of the trade dulness it to be sought. Over the North the wet seasons, the great competition with the produce of the cheap land of other countries and climes has affected the agricultural interest ; lessened its ability to buy cloth, iron, implements, and many of the luxuries of life, so that the result of the agricultural dulness is felt in the mining and metallurgical districts directly and indirectly. Labour has come from the land to the loom, the mine, and the factory ; the latter have had a glut of labour, but the land does not produce what it should, nor is it likely until there is cheaper land and better conditions of ownership and of cultivation. Through the fifty years there have been two movements evident as to land and agriculture : there was in the first half a general, if slow, increase in prices of many articles—an increase due in degree to the larger demand, the possibility of better transit to market and to allied causes ; whilst as a consequence of better prices and of greater demand for land the rent of the latter rose. Prices have fallen much of recent : from 1860, when wheat averaged for ten preceding years over 50s. per quarter, the price fell for a quarter of a century, and only in the last years of that period did "agricultural depression" have its inevitable effect—that of the ultimate reduction of rents of agricultural land. The mills of the economic law of demand and supply work through prices, they "grind slowly but they grind exceedingly small." And very slowly but surely the long descent in prices is affecting the rent of farms. Here is an interesting table, from Mulhall, giving the burdens of the farmers of the United Kingdom, in averages for a year :—

Period.	Rent. Millions.	Taxes and Tithes. £	Total. £
1841-50	56·4	10·2	66·6
1851-60	57·5	11·0	68·5
1861-70	61·2	15·3	76·5
1871-80	64·7	23·1	87·8
1881-85	67·3	25·3	92·6
1886—	65·1	25·4	90·5

Thus year by year over the decennial periods the rents of the farmer increased, but now that increase has been checked, and there is a substantial reduction which must go on. And even in that burden of taxes and tithes which has grown more rapidly even than rent, there is at last a check to the rapidity of the increase, and it is probable that

there will soon be seen some reduction at last. It is out of these reductions that the agricultural interest will know its position to be improved ; but it is very certain that at the present by far the gravest point in the industrial outlook, nationally as well as locally, is the intense dulness and loss that have been known in agriculture, and of which the depression in manufactures is in a considerable degree the outcome.

INDUSTRIAL GROWTH CHECKED.

It should not be forgotten, before conclusion, that the industrial growth of this district, as well as of the nation, has of late years been checked. We are producing less coal, whilst the exports of that fuel are still enlarging, and thus much less is being consumed at home. We are making less iron, although we are importing much more ore from abroad, so that it is evident that we are using less of our own ironstone and more foreign, whilst the total iron smelted from the ores is less than it was. We produce less lead, and we bring more in from Spain and Greece. We make a smaller quantity of chemicals, and our imports are on the whole more than they were. Our textile manufactures do not advance as they were wont to do ; shipbuilding is only to the extent sufficient to make up the gaps which ocean makes in the fleets of the world ; and though in some branches of machinery we retain our position, we do not make locomotives for the world as we did, nor do we not even make them for our colonies. Looked at over the whole region of industry from agricultural to the latest development of commercial enterprise, and also looked at locally or nationally we find that there has been in the later years of the half-century a check to that industrial development, of which the first three or four decades show such marvellous signs. It is an interesting question whether that is due to the flagging of the energies of the manufacturers here, or to the markets we once supplied being occupied by other competitors, or in other ways closed against us ? It is probable that all these causes have combined to check our industrial development. The concurrent testimony of so many of our consuls, the opinions of so many experts, and the expression of the witnesses before and the members of the Royal Commission on Trade Depression, all point to the fact that there is not that keen search after new markets on the part of our manufacturers that there was—but the need for it is greater now when there are more competitors. Again, there is too much adherence to old methods of production. It was in England that the basic process in the iron trade was brought to perfection, but it is already far more in use on the Continent than it is here. Numberless such instances could be given, so that there is some "flagging" on the part of our producers. Again, we find that in coal, in iron, in textiles, and in chemicals, some of the Continental countries are now producing not only enough for their own needs, but enough and to spare for other markets, so that the markets of these countries must to a large extent be closed against us. And it is idle to conceal the fact that the tariffs of other countries have had a strong ten-

dency to drive the demand from us—or, rather, to prevent our supplying that demand as cheaply as can the protected makers in the countries where these unfair expedients are resorted to. We may conclude, therefore, that all these causes contribute to the check to the industrial development which we have of late known. Some figures as to coal production in Northumberland illustrate this. Last year there were produced in Northumberland not less than 7,305,182 tons of coal. It is interesting to notice that this is only 49,000 tons less than the preceding year's production, so that the output is near to the maximum yield of the northern county. And it is further remarkable that the production thus attained has been with a very considerable diminution in the number of workmen employed. Thus the average yield per man is considerably increased in the past year above its predecessor. But a further and still more startling fact has transpired since the period to which these official statistics bring us ; and that is the almost complete cessation of production in the Northumbrian coal trade for fourteen weeks, and there has been practically no effect on the coal trade of the kingdom. These two facts enable us to appreciate with a little more exactness the position of the Northumberland coal trade. It once influenced all the markets. It has enlarged its own output considerably in the past ten years or so, and, as we have seen, it almost maintained last year the maximum output, but despite this, the cessation of production almost completely for three months, has not affected the coal markets of the kingdom. In many months one-half of the coal sea-borne for London is supplied from the port of Newcastle, and there has, of course, been the withdrawal of a portion of that supply, so that the strike has caused the demand to need gratification in part from other districts. The strike has, indeed, had little or no effect, because there is such competition in the coal trade that the withdrawal of a district that could have produced 2,000,000 tons of coal has not been appreciably felt on the trade. And whilst that lagging in the demand continues, there is not likely to be any return to the progress in industrial matters characteristic of the first half of the century. If the trade of a district and of many distant ports can dispense with Northumbrian coal for so long as it has done, then it is clear that under given circumstances, or under the pressure of very heavy duties imposed in other countries, there are industries here whose production can be dispensed with entirely. In a case like that, there must be new markets sought, or there must be diminished output. But it is clear that the output cannot be maintained if there is to be the dependence merely on old markets which are in a degree closing to us for a time. Whether there will be a continued closure of those markets to our productions remains to be seen.

OUR INDUSTRIAL FUTURE.

This brings us to the grave question of the future of the trades in this district, and of the enlarged and enlarging population dependent on these industries. It is clear that if our trade development has suffered a check of the magnitude that it

has, and if the population has grown as it has and still grows, there will need to be an alteration in the conditions under which we have been living of late. If an exhaustive analysis of the figures we have summarised were made, it would be clearly seen that there has been an order in the manner in which our industrial development has proceeded, and in the manner in which capital has been invested, which is very remarkable and suggestive. Space does not allow the presentation of that exhaustive analysis, but some of its conclusions may be glanced at as a fitting sequel to the story contained in previous pages. First, then, the flow of capital has been almost unchecked, but it has sought those northern streams only as long as they were remunerative to the capitalist. Up to twelve years ago, capital in abundance could be had for the asking for the coal and iron mine, the blast furnace, and the rolling mill, but after that time losses ensued of serious moment, capital became unproductive generally in these industries, and it is only in rare cases that there can be found additional money to develop new mines and ironworks. After that period wealth sought new modes of use, and the steamship and allied methods of investment took up much of the surplus cash that sought for investment. Indeed, it is rare to find that readiness to put money into ships as was known in the North-east for "seven years of plenty" in the shipping trade. But since that time, the rush of capital into the shipping trade has changed its position, and now capital for new and additional vessels may be said to have forsaken for a time the shipping industry, and to be seeking other fields of employment, where there is more certainty of an adequate remuneration for the risk. And if the rise of that capital be investigated a little further we shall find that there has been a mania for railways and for other modes of investment, so that demand and supply working through price and profit have had much to do with the position of commerce, and with the mode of industrial development and the employment of labour.

CAPITAL LEAVING THE LAND.

But there is another fact which has its significance, and that is the manner in which our greatest industry has declined as an investment for capital. As far as we know, there are no local statistics bearing on the point, but those for the United Kingdom are substantially thus: taking an average of years we produced grain crops worth £74,300,000 yearly in the decade from 1840 to 1850; but in the years 1881 to 1885 the value of the grain crops only averaged £51,700,000 yearly. The fall is the more remarkable in the wheat produce: in the first period our wheat harvest was on an average 115,000,000 bushels yearly; but that average has fallen until for the last period of five years the produce has been only 76 millions yearly. We have in the interval reclaimed much waste land, but we produce much less wheat; and though there has been additional horned stock raised, yet there is little doubt that capital is leaving the land. At the beginning of the half-century we imported on the

average 14,000,000 bushels of wheat yearly; now we import more than ten times that amount. We have allowed capital to leave the land, and we have in consequence more and more to import our food from other countries. About one-third of the grain for our food is grown in this country; as much is brought in from that land to which a large portion of the emigrants go—the United States—and India and Russia send us the largest part of the remainder. Similarly, though not so fully, we have an increasing portion of our meat supply drawn in one form or another from abroad, and thus with less money invested in our own land, and less labour employed upon it, we have a larger part of our money sent to other nations in return for the food we buy. In a sentence, in fifty years we have increased our mines, our mills, our factories, and our furnaces, but we have diminished the yield of our land, lessened the labour it employs, and increased our dependence upon other nations. It is then in the direction of the better use of our land that we have to look for permanent relief from the dull trade and the glut of labour in the constructive, mining, and mineral industries. If we increase the production of our coal we are taking away permanently part of the resources of our nation, and it is worth while noticing that there is in its use much waste. But if we increase our wheat yield by better cultivation and by lessening the burdens on the land, so as to make it cheaper to cultivate, we enrich ourselves without lessening the benefit that posterity reaps from us. One of the needs, then, of this age, is the enlargement of the production of the United Kingdom, as well as what has been done of late years, the increase of the means of transit and of distribution of the products of the land. More and more it may be needful for the nation to be dependent, and in some way or other to make its own land serve more and more its own needs. Nations cannot for ever take pay for food in rails; if they have coal within themselves, they will not always take pay for corn in coal, and it is thus a question of time only how long it will be before we are forced into that larger production of food in some form here which is so essential now. It is not for us to dogmatise on the question whether the farmer shall give more attention to "horn" or "corn." It is sufficient to state that the long range of low prices has had its first effect in lessening the production of farming produce at home, and it is beginning that effect which is secondary—the reduction of the burdens in the shape of rent, tithe, and tax that the farmer has to bear. But there is the national need that we have indicated—the need that farming here should supply more of the food and employ more of the surplus labour of the United Kingdom. It is possible that it may have to be through cheaper land and cheaper means of cultivation that farming may be made to pay. But it will have to be agriculture directed by intelligence and experience, knowing the best markets of sale, having the right to use fairly the land, untrammelled by ancient prejudices and customs, and willing to adapt land and labour for the production of food in the form that the wish—even the whim—of the people makes desirable. The farmer has this ad-

vantage over most other industrials : the home market demands more than he can supply ; his rivals must spend large sums to bring produce into that market ; and in these sums profit should be found. The farmer's land must be cheaper, and his rating must be less. He must be willing to produce the articles for which the best price is obtainable ; and it may be that he will need to cultivate, as of old, a more direct relationship with the consumer. In these ways farming may be made to pay, but it cannot with dear land, its use fettered, and its produce too heavily taxed in the attempt to find a market in this country. And to that improvement in agriculture we have to look for a commencement of the industrial growth which is so greatly the characteristic of the last half century.

INDUSTRY AND AGRICULTURE.

It has been said that railways form the means of investment for a large portion—perhaps a tenth—of the wealth of the United Kingdom. They serve all the needs for travel by land in their bounds. In coal we have another measure of wealth, and another means of supplying the needs of the country—and these needs are supplied without the importation of foreign coal. In iron, except for a slight introduction of very rich iron from Sweden, we have no import of the manufactured article of moment for consumption here. In shipping, though we buy much of the goods of foreigners, yet we increasingly use our own vessels to carry them. Nearly fifty years ago 58 per cent. of the entrances and clearances into and from the United Kingdom were in British vessels ; but in the latest year we have records 73 per cent. was in British vessels. Thus manufacturers and carriers here supply more and more of the needs of the people of this country ; but, as we have shown, agriculture here—the trade in which most wealth is invested—supplies less and less of the needs of Great Britain. It is thus clear that it is not so much to manufactures but to farming that we have to turn to find a method of improvement for the depressed state of the country, and to find a revival permanently of that trade. We have in fifty years very largely increased our population. As we have shown, in the North-east, we have more than doubled it in comparatively a few years. But we have very fully met all the needs of that enlarged population for fuel, clothing, iron, travel, carriage—everything but food. We have been content to buy corn, and we have now to face a period when other nations are beginning to produce enough for their own requirements of all that we have been in the habit of paying them for food with. The problem before us at the end of the jubilee of industry is—shall we find fresh markets for our iron, for a time, or shall we not rather begin at once the task of endeavouring more fully to supply the primary need of man, and thus give employment for labour on the land, and retain much wealth at home to enable us to give in that market which is peculiarly our own more work for the craftsmen ?

Thus, then, we have looked at the results of "fifty years" in one corner of Europe. And just as Harrison says of "Historic London," so it may

be said of this North-country : "As I walk about the streets of [one of the] most mighty, most wonderful, most unwieldy, and yet most memorable of cities," a record of power and life rises from the days when Agricola overran the northern parts of this land. There are four objects seen at one glance which gather into one focus the history of the town : the Castle and the Cathedral church, which speak of the ancient story and the ancient powers that ruled ; the old locomotive and the High Level Bridge, which bespeak the modern civilisation and the modern powers. Battle and siege ; monument and shrine ; travel and traffic—the old and the new are within a few yards of each other. There is a continuous history of castle and cathedral for centuries ; there is of engine and bridge not one for half a century, but in so far as the town the four look upon is concerned, there is more change and more of progress than in the previous centuries. Thought and action have been crowded into brief lives, and the structures in iron remain whilst the builders have passed into the silent land. But in the works which endure there are abiding monuments of the father and the son, born on Tyneside, and finding on its banks much of the triumphs of their lives, and having much of the pleasant memories connected with Wylam and Willington and Killingworth. Their part in the Northern land is that of memory only—

Their part in all the pomp that fills
The circuit of the summer hills,
Is—that their graves are green.

That fame and their memories the world will not willingly let die, nor will it the work they wrought, nor the changes accomplished and expectant, which have come from and are to follow the development of mining, metallurgy, and engineering in the North-east. They had helpers, colleagues, rivals ; and they have followers and professional, if not personal, descendants. William Hedley, Timothy Hackworth, and many others, had much to do with the early development of the locomotive ; and the Hawthorns and other Tyneside men did more than yeoman service. In later days of the era we have discussed, there are many men who in engineering and mining industries have done much to build up Northern trades. On the railway, Harrison and Tennant are familiar names ; in mining, the Elliots and the Forsters are amongst the foremost ; in shipbuilding the Palmers and the Laings are world-known by their productions. And there is another, who has at Elswick contributed to the victories alike of peace and of war. In the half century, through the efforts of Sir William G. Armstrong and his lieutenants, there has been built up what has not unfittingly been called a "supplementary arsenal"—an establishment which has, as far as we know, no rival in the world. Every yard of seventy acres on Tyneside is thronged with the present-day proofs of the prescience of the engineer, in hydraulics, in gunnery, and in ships. And whilst there are with us such men as Sir William Armstrong, the age need not so much dread comparison with the past.

PART II.

THE JUBILEE EXHIBITION.
REPORTS BY EMINENT SPECIALISTS.

Reprinted from "The Newcastle Daily Chronicle," of May 11, 1887.

GUNS AND WARSHIPS.

[BY THE EDITOR.]

In presenting to our readers a series of reports on the principal sections of the Exhibition, specially written for us by experts who are eminent in their several walks of industrial life, it is fitting that we should lead off with a brief dissertation on the subject of the war-ship and the big gun, inasmuch as such formidable representations of the "resources of civilisation" are most prominent in the eye of the visitor as soon as he has passed the turnstiles and made his way into the principal court. Facing him, on his left, is the model of the formidable ironclad, built by Sir W. G. Armstrong, Mitchell, and Co., recently launched at Elswick; and on his right looms that magnificent object, the famous 110-ton gun. Such exhibits are not those which one likes to dwell upon in an exhibition which should be devoted to the demonstration of the arts of peace, but as long as human nature remains what it is, there will be "wars and rumours of wars," and the moral is that to be forewarned is to be forearmed.

There is no country more vulnerable than Great Britain; and thus it needs, more than most, protection for itself, its wide commerce, and numerous colonies. Other nations are more or less self-dependent, but ours is dependent on its commerce, and for a large part of its food on outside nations. For the protection of its commerce and its ships it must have a numerous fleet; but there is yet a difference of opinion as to the kind of ships that are most needed, though the opinion is inclining more to the form of men-of-war of the protective cruiser type. Five years ago, in an address as President of the Institute of Civil Engineers, Sir W. Armstrong pointed out the dependence of Great Britain upon her naval power, and the reasons then urged by him in favour of swift cruisers have acquired greater force in the interval. When it became established that fighting ships could be manoeuvred with certainty and precision by means of steam-power, the revolution began which has continued since, and which has gradually made naval warfare an engineering matter rather than one of seamanship. And when to that change was added that of the introduction of rifled ordnance and percussion shells, the contest commenced between guns and armour which has gone on and is not yet decided. Types of vessels have been changing, and some

built have become obsolete soon after they have been launched. Invulnerability was believed to be attainable, and great attempts at vast cost were made to secure it, but we may now feel assured that "invulnerability is a chimera." Armour is unavailable against torpedoes, and every attempt to secure invulnerability by increased thickness of armour is met by an increase in the power of artillery. In the address to the Institution of Civil Engineers, five years ago, Sir William said:—

Our early ironclads, like the *Warrior*, were plated all over with armour of $4\frac{1}{2}$ inches thick—a thickness which could now be pierced with field pieces. To resist the most powerful guns now afloat, armour of at least 2 feet in thickness is required; and in order to reconcile the constantly increasing thickness with the weight which the ship is capable of carrying, it has been necessary to restrict the area of armoured surface to ever-narrowing limits, leaving a large portion of the ship without protection. In those magnificent and tremendous vessels which the Italians are now building, the armour will be withdrawn from every part except the battery, where guns of 100 tons will be placed, and where the armour will be confined to a narrow belt of great thickness. Everything of importance that projectiles can destroy will be kept below water level, and, so far as artillery fire is concerned, the ships will be secured against striking by means of an underwater deck and ample division into compartments. Armour, therefore, seems gradually contracting to the vanishing point; but, until it actually disappear, it is more probable that no better application of it can be made than has been decided upon by the acute and enterprising naval authorities of Italy for the great ships they are now constructing.

It is known that Sir W. G. Armstrong adheres to these views; and they have been fully justified by the course of events in the five years which have elapsed since they were uttered. Nations have turned in that direction ever since. Armour on the "ironclads" is now so thick that its weight necessarily limits to small dimensions the area of its use. The weight of armour to be carried is adverse to speed and offensive power, and the question arises whether the armour clad will be long deemed worth the heavy cost, when put into comparison with what the same amount would have provided in swift cruisers. Our Admiralty now only propose to build armour clads to keep us abreast of other nations.

There is no such thing now as the ironclad in the sense originally contemplated—"a ship in armour." What is meant now is a ship with thick armour in certain critical points. Going over the *Victoria* it seems singular to note the small area she has armour-plated, but what she carries is of great thickness and of great weight. Her displacement is over 10,500 tons; and

being propelled by engines of 12,000 horse power, she may reach a speed of 17 knots per hour. Such a vessel would have been much more costly ten or twelve years ago, for steel and iron were then double their present price. Even with cheap material, her cost with armament and engines complete, will probably be three-quarters of a million. We might fairly say that for the cost of one such ironclad we could have four unarmoured ships of the protected cruiser class of far higher speed, and carrying collectively four armaments, each equal to that of the armoured vessel. The unarmoured vessel can carry as big guns as the armoured, and even more of them, as the vessels are relieved from the weight of armour. Then there is the danger from torpedoes; there is no doubt that the torpedo attack will play an important part in future warfare, but it is still a matter of doubt as to the extent of their value. All parties seem to admit that though the effects may be overrated they will still be formidable. The evolutions now progressing are chiefly to show to what extent torpedoes will be valuable; but so far they have scarcely realised what was expected from them. At Elswick the firm has gone on increasing the speeds of their cruisers; and the last one built for the Italians was the swiftest cruiser afloat, having a speed of over 19½ knots per hour. Nothing is now so completely recognised as the value of speed in war ships. Most English cruisers now being built are belted cruisers; the "belt" may have advantages, but it has to a considerable degree the disadvantages of armour, and it is a question whether it would not be better to multiply cruisers without belts.

We have next to no experience of ironclads in action. The Americans used them twenty-five years ago, but the idea was in a crude state then, and there is very little experience on which a definite opinion can be formed as to their behaviour in action. We know the action of shells, the effect of projectiles, but our opinions as to the results on ironclads are largely speculative.

The *Esmeralda* is the first example of the Elswick cruisers. In the few years since she was built, the company has increased the speed of cruisers by adopting improved forms of engines. The *Esmeralda* had compound engines, but now triple expansion engines are general. Quadruple expansion engines have not been introduced for war ships, though the question of their introduction has been discussed. More may be done by the introduction of liquid fuel, because a ton of petroleum will be as useful as two tons of coal, so that with the same weight of fuel we could double the time the vessel could keep the sea. For long voyages, the drift of improvement seems to lie more in the direction of the use of liquid fuel than in that of quadruple expansion engines.

The "big gun" is the corollary of the armour. If you give up armour the big gun may go out of use, - but so long as an enemy carries armour we must have big guns to penetrate it. The power of attack, apparently, must overtake the defence; and the sooner we give up the ponderous defence of armour the better. There is another formidable species of armament to which great attention is being given at Elswick—the quick-firing guns

which are so rapidly coming forward. It is expected that these guns will come more into vogue. A 40-pounder of this description recently made at Elswick can be fired ten times a minute with four men, while the old smooth-bore 32-pounder of the British navy could only be fired once a minute with eight men.

Another feature is the employment of machinery for working guns. Large guns could not now be worked without machinery. Even if it were possible to deal with such heavy guns and ammunition (powder and shot together weighing 2,700 lbs.), "the multitude of men required for the purpose would be greater than could find standing-room at the guns. Up to a certain point hand-power may be so aided by machinery as to enable larger guns to be worked by men than was formerly deemed to be possible; but the mechanism required to render hand-labour available is quite as liable to be disabled by an enemy's fire as that which would be applied in connexion with engine power. There is therefore no reason in this respect for employing a numerous gun crew in preference to inanimate power. Automatic methods of running out the gun, by which the gun is lifted in recoiling by slides or radius bars, and recovers its position by gravitation, may in many cases be advantageously used to save labour, but in a ship the varying inclination of the deck interferes with uniformity of action. The upward motion of the gun also involves the objection of a higher port, and it adds greatly to the downward shock, which becomes very severe on the deck where the guns are large and are fired at considerable elevation with such heavy charges as are now usual. Steam power, acting through the medium of hydraulic pressure, is already largely applied in recent ships for effecting all the operations of working the guns." Hydraulic machinery, the appliances of which are patented and the patents are vested in the Elswick Company, have effected the change. The inventions were purely and entirely the origin of Elswick, and they were first introduced in connexion with the Italian ships, but the use is now becoming universal. Elswick is the cradle of hydraulic machinery, and it has no competitor in its application to naval purposes. The more we extend the use of machinery, the fewer men will be required to serve the guns; and the smaller the crew, the less the loss of life and injury. Hydraulic machinery is an absolute necessity for large guns; it is not absolutely necessary for small guns, but it has many advantages even for them.

Elswick has grown in the past, and if the past is to be a test of the future, it will grow. It now covers more than 70 acres, and employs more than 12,000 men. The task of supervision and direction is serious and heavy, so that some might desire no further growth, but if the experience of the past prevails, Elswick will grow.

Attention at Elswick has been directed to the use of explosives of the dynamite family; and it is under consideration now. Shells of this character, which may be called "highly explosive," will probably come more into use. There is no difficulty in their propulsion, if a low velocity is satisfactory, for air or gas may be used in various forms for that propulsion.

There is a great question whether the Government dockyards should build new vessels or be confined to repairing, except in cases of emergency, wars, &c. It is contended by some that we should only have recourse to private shipbuilding yards on an emergency, but it is forgotten that a nation could not depend on private enterprise to supply its needs, unless it gives continual and not occasional employment. If Elswick had not had its foreign connexion, it could not have been in a position to serve the Government. The dockyards should be constantly employed in making experiments, in modelling, in testing, as well as in repairing.

THE CHEMICAL INDUSTRY OF THE NORTH.

[BY MR. HUGH BELL, MIDDLESBROUGH.]

The history of the growth of the alkali trade of the Tyne takes us back to the close of the last century, when the Losh family were endeavouring to utilise the brine spring of the Walker Colliery for the manufacture of soda. The word alkali itself carries us to the days before chemistry had become a science, when the Arabs were the chief, if not the sole, trustees of such physical science as existed. A full account of the circumstances under which a word signifying "to roast" came to designate a great class of chemical compounds would be a history of human thought and the progress of human knowledge, and the merest outline of the changes which have taken place would lead us far beyond the space which the most indulgent editor would accord. Some lines, however, we may devote to this part of the subject, although it is but indirectly connected with the title of the article.

ANCIENT ALKALI.

Alkali, then, is an Arabic word signifying "the roast," and was applied to the ashes of plants found growing on the shores of the Mediterranean, whose scientific names are *Salsola* and *Salicornia*. Alkali is thus simply a substance got from the ashes of certain plants, and chiefly from those above named. Until something over a century ago these plants were the only source of a substance entering very largely into the arts by which human life is made more pleasant. The knowledge of this substance goes back to a very remote antiquity, for glass, one of the chief articles into which it enters, has been known to the human race for many a century.

CHEMISTRY AS A SCIENCE.

With the dawn of chemistry, when the science was ceasing to occupy herself with such transcendental studies as the transmutation of metals, the search for the alkahest or the universal solvent, and the panacea, the universal remedy, and was seeking to classify the knowledge already won, we find her grouping together, as allied substances, two kinds of alkali. But as yet she was under the dominion of hidden entities, and as phlogiston was a substance which favoured combustion, and anti-phlogiston one which was inimical to it, so alkali was that substance whose presence, "fixed" in soda

and potash, and "volatile" in ammonia (or spirits of hartshorn) gave to these varieties of matter their essential qualities. A hundred and fifty years ago this theory was abandoned, and chemistry, now a positive science, was content to say that there were three distinct substances which, possessing qualities in common, should be grouped together as alkalies. To these were given the names of mineral, vegetable, and animal from the sources from which they were drawn.

THE MODERN METALS.

Between the alkali from which the name was derived and the volatile alkali of which we have spoken, there does indeed exist a very essential difference, first shown by Sir H. Davy, who succeeded in decomposing the fixed alkalies, till then regarded as elementary bodies into what, as yet, we must regard as their ultimate parts. They were found to consist of oxygen and distinctive metallic substances, sodium and potassium, possessing certain properties in common. Volatile alkali, on the other hand, is a compound of hydrogen and nitrogen, with which oxygen is further combined. It is interesting to note that the distinguished Frenchman Lavoisier, whose contributions to human knowledge were cutshort by his death on the scaffold at the hands of the revolutionary tribunals of 1792, had already suggested that the fixed alkalies were oxides of metals having greater affinity with the oxygen combined with them than carbon possesses, and thus, in the then state of knowledge, inseparable from that oxygen. Modern chemistry groups these substances together by their common properties of neutralising acids and certain other qualities; adds various others having like qualities; subdivides the group of alkalies into several others; forms a sort of parallel class to which she gives the name of alkaloid; and for reasons which would lead us too far from our subject, regards ammonia as the link which connects the alkaloids, which belong to organic chemistry; with the mineral alkalies from which, as we have seen, the word was originally derived.

SODA.

But although in a chemical sense alkali has the extended meaning just described, as a commercial term it is confined to the substance to which the word was first applied—namely, soda. Soda plays an important part in the arts. We have already mentioned its use in the manufacture of glass, which is a compound of soda with silica. It is used in the manufacture of soap, and is largely employed in the textile industries for removing from materials to be spun and woven the oily substances with which they are impregnated. In paper-making and in dyeing soda plays an important part. It is thus evident how indispensable it is to mankind. When the sole source of supply was the ashes of a plant containing but a small quantity of the material, it will be easily understood how great an obstacle was put to the development of industry on anything like the scale which has marked the nineteenth century. So much is this the case that there have been found persons of authority ready to assert that the discovery of the method we are about to describe under the name of Leblanc has done more than any other, after the changes we

associate with the name of Stephenson, to render these developments possible.

MR. LOSH AND LORD DUNDONALD.

In 1787 soda was obtained chiefly, if not entirely, in the way already indicated, although a number of other methods were attempted to produce it from salt ; for it had already been discovered that salt could be made to yield soda. Mr. William Losh had devoted time and money to investigations having this object, and another resident on Tyneside, Mr. Thomas Doubleday, was also working in the same direction. When Lord Dundonald came to reside in the neighbourhood of Newcastle he joined the other two, whose investigations had up till then been carried on independently, and the three worked together for some time with but little result.

THE LEBLANC PROCESS.

Other workers were also busy with the same problem, and as early as 1787 Leblanc, whose name we have already mentioned, had invented and patented his process, while Dizduic, also a native of France, had about the same time hit upon a method not greatly differing from his compatriot's. Leblanc proposed to treat salt with sulphuric acid, whereby what is now known as sulphate of soda or salt cake is produced, together with hydrochloric acid gas. The salt cake he mixed with chalk and lime and furnace. The furnace product was then lixiviated, the resulting liquid boiled down to dryness, and thus remained in the vessel a substance which, furnace again under suitable conditions, yielded a white material—the soda ash of commerce. This in a few words describes the Leblanc process, by which, until within quite recent years, the whole of the soda of the world, with only the most trifling exceptions, was produced. Leblanc himself failed to reap any benefit from his invention—like his greater fellow-countryman, he fell under the suspicions of the revolutionary authorities, his works were sequestered, he was compelled to disclose the secret of his manufacture ; and although he escaped the fate of Lavoisier, it was only to die by his own hand in 1806, a broken and disappointed man. The tardy honour of a statue, unveiled 30 years after his death, amidst the plaudits of the crowd and a eulogy pronounced by some eloquent statesman, are but inadequate compensations for such misfortunes.

SULPHATE OF SODA.

The records of the early manufacture of the Tyne are somewhat confused, but it appears that on Mr. W. Losh's return from France, where he resided in 1791, he established the manufacture of sulphate of soda. The brine spring in the Walker Colliery was the source of the salt he required for the process. In those days a duty of £36 on salt hampered the English manufacturers, just as the present duties, much less in amount, throw obstacles in the way of the manufacturers of Germany and France. Instead, therefore, of using salt, the Walker Alkali Company mixed the sulphuric acid with brine, and, evaporating these two together, obtained sulphate of soda ; or, mixing ground coke and ashes with the salt as it crystal-

lised, rendered it unmerchantable, and, consequently, not liable to duty.

SULPHURIC ACID.

The manufacture of sulphuric acid takes us back forty or fifty years further, to about 1740, but the eighteenth century had closed before that substance was produced on the Tyne, and it was not till 1809 or 1810 that chambers for its manufacture were established at Bill Quay. In 1816 Mr. Losh was again in Paris, and on his return brought with him the plan of decomposing sulphate of soda by the method still in use. This he adopted at Walker, and on this and on other grounds we have mentioned rests his claim to be regarded as the father of the alkali trade of the Tyne, and indeed of the kingdom.

SALT AND CHEAP COAL.

The salt springs of the coal measures of Northumberland and Durham had long been known and utilised, and to their existence was due, as we have said, the establishment of the alkali trade on the Tyne. Its enormous development is, however, to be attributed to another circumstance—the cheap fuel of the Northern coalfield. Till comparatively recently small coals were a drug, and indeed a serious inconvenience to the coalowner. Unable to dispose of them, he was compelled to pile them up in great heaps at the colliery. The sulphur they contained caused them to take fire, and there resulted the huge bonfires which, thirty or forty years ago, marked, by their flames and the havoc worked on the surrounding vegetation, the sites of the larger coal pits. Such quantities as were needed for manufacturing purposes, and could be put into craft on the river, could be obtained for the cost of removal. It was for this reason that up till 1802 salt was made from sea water at Shields, consuming 50 cwt. of coal to produce one ton of salt. The salt obtained was highly prized for its curing qualities. Even to the present day a small quantity is produced, waste heat being utilised for evaporating, and rock salt from Cheshire and elsewhere being added to the sea water to lessen the cost of manufacture. This trade, which was at one time pursued by some of the leading families of Tyneside, has now become a very unimportant branch of the industries of the town. As time went on, however, and the Cleveland iron trade came into existence, the small coke of the bituminous seams of Durham began to rise in value. Of extreme purity, and producing coke of unequalled quality for use in the blast furnace, a market was found for what had been only a drawback to the colliery owner. Coal was no longer to be obtained for the cost of boating. At the same time the coal fields of Lancashire were developing, and the Tyne ceased to occupy the firm position she had hitherto possessed.

REVERSES OF FORTUNE.

The salt needed for the manufacturer came from Cheshire with a carriage of from 7s. to 10s. per ton, or a water freight of but little less ; while the Lancashire soda maker had not half as much to pay for carriage. The fuel, an important factor in the Leblanc process, had ceased to be obtainable at

nearly nominal prices. The American market, one of the chief outlets, was better served from Liverpool. These circumstances all conspired to alter in a most serious way the position of the alkali maker on the Tyne. And, as if to fill the cup of his misfortune to the brim, a new method of manufacture, talked of since 1835, was brought to a commercial success at the same moment.

THE SOLVAY PROCESS.

It had long been known that salt could be decomposed by bicarbonate of ammonia, and many endeavours had been made since the original patentees, Messrs. Hemming and Dyar, had, about the year just named, sought to utilise this fact. But till 1855 no progress had been made. In that year Messrs. Schloesing and Rolland published a memoir on the subject, and subsequently the question was taken up by Mr. Solvay, of Brussels. With indomitable perseverance and courage, in the face of most disheartening difficulties, this gentleman and his brother, aided by others no less persevering than themselves, succeeded in contriving apparatus by which the decomposition could be effected on a commercial scale. Mr. Schloesing, equally determined, pursued his investigations, and though somewhat later than Messrs. Solvay, succeeded in designing a method, different in some important points, though founded on the same reaction, by which soda could be made. The Tyne alkali trade which at one time consumed as much as 250,000 tons of salt a year, now requires barely half that quantity, and has only been able to maintain this consumption by the aid of circumstances to which we must now turn our attention.

NOXIOUS VAPOURS.

It has been mentioned incidentally that one of the results of decomposing salt by means of sulphuric acid, is the production of hydrochloric acid. This is given off in the form of a singularly acrid gas. In the olden days when the flaming heaps of small coal escaped indictment as nuisances, when manufacturers polluted streams according to their wills (far from sweet), and alkali inspectors, the barbarous invention of a later age, were unknown, this pungent and destructive gas was thrown into the air, killing the surrounding vegetation, besides rendering human life all but impossible. The lovely banks of the Tyne, which many men recollect covered with luxuriant verdure, speedily suffered, while the owners of the alkali works amassed fortunes and provided employment for operatives by the score and the hundred. Possibly this state of things, being felt to be incurable, would have been endured, but it was discovered by the grandfather of Sir Charles Tennant that hydrochloric acid could be made use of as a source of chlorine, which, in its turn, is of great value as a bleaching agent. The alkali manufacturers were consequently not unwilling to come under the provisions of the series of Acts of Parliament having for their object the removal of the nuisance to which we have referred.

THE RIVAL PROCESSES.

The ammonia soda maker, whatever process he adopts, finds that the chlorine, which with sodium

forms the salt he uses, leaves his hands in a form which renders its recovery exceedingly difficult. Numerous plans have been suggested for obtaining the chlorine, and no doubt this will be ultimately achieved. To describe those which have been attempted would lead us into matter too technical for our present purpose—it suffices to say that as yet no method has been successful. Accordingly, the price of bleaching powder, in which form the Leblanc alkali maker disposes of his chlorine, has risen in price as the quantity of salt decomposed by sulphuric acid has decreased. At the same time soda has fallen in price, and the ammonia soda maker, with only one string to his bow, finds himself face to face with an awkward problem:—can he manage to exist if the Leblanc maker sells his soda ash as a waste product. Moreover, driven by a stern necessity, the Leblanc maker has greatly improved his process in recent years. He has economised in all directions, and especially has turned his attention to obtaining the largest possible quantity of valuable chlorine with the smallest possible quantity of the comparatively valueless soda ash. The consequence is that soda ash, which even two years ago was sold for about £6 per ton, now fetches little over £4—and the fall still continues—while bleaching powder, which has in past years fallen below £4, now realizes between £7 and £8. It may be affirmed with safety that the relative advantages of the two processes will be maintained until some ingenious man hits on a plan of recovering the chlorine now thrown away by the ammonia soda maker. When that day comes it would look as if the death knell of the Leblanc process will indeed have sounded, but threatened men live long, and it is extraordinary how a great industry adapts itself to conditions which appear at the first blush incompatible with its continuance on any terms whatever.

THE TEES SALT BEDS DISCOVERED.

The alteration in the price of soda ash and bleaching powder has of course affected the Leblanc makers not only on the Tyne, but also in all other districts where this process is followed, and but for the next circumstance with which we have to deal the alkali trade of the Tyne, languishing and in fact threatened with speedy extinction, must have succumbed before the competition of more favoured districts. But in the year 1862 Messrs. Bolckow and Vaughan, boring for water at Middlesbrough, came, at a depth of 1,200ft., on a bed of salt 100ft. thick. Some years elapsed before any use was made of this discovery. The original discoverers—or, more correctly, the limited company to whom in the meanwhile they had sold their works—endeavoured to obtain access to this bed of salt by sinking shafts, but their attempt was perforce abandoned owing to the enormous quantity of water encountered.

A BETTER METHOD THAN MINING.

It was reserved for Messrs. Bell Brothers, Limited, to introduce the method since universally adopted, by which the mineral could be won without the costly process of sinking a shaft. In 1881, on the suggestion of Mr. Thomas Bell, a bore hole

16 inches in diameter was put down to the salt. The whole was lined with wrought-iron tubes, and a second series of tubes 8 inches in diameter was placed in the first. Into the annular space between these two tubes water was introduced. It flowed down the hole till it reached the top of the bed of salt, which it proceeded to dissolve. The inner tube was pierced with holes at the bottom only. The water flowing down the annulus would in the ordinary course have risen to the same level in the inner as in the outer tube. But since it had become heavier by the fact of its having dissolved salt, it only rose to a height determined by the specific gravity of the two liquids; that is to say, the heavier column was the shorter. The specific gravity of saturated solution of salt being 1.2, water being taken at 1.0, a column of water 1,200 ft. long will balance a column of brine measuring 1,000 ft. That is to say, the top of the brine would be 200 ft. below the surface, from which point it must be lifted by a pump. By the month of August 1882, the plan we have thus rapidly described was in operation at the works of Messrs. Bell Brothers, Limited, at Clarence, and very shortly after that date salt was being sent to the chemical manufacturers of the Tyne.

CHEAPER SALT.

Cheshire salt, till now by far the most important source of supply, had been sold as high as 23s. in 1874. It had stood for a year about 20s., and for a considerable period varied from 15s. to 17s. In August, 1882, it was selling at 12s. 6d. in the Tyne. The competition of the new source of supply speedily reduced the price, and to-day salt can be bought in the Tyne at from 10s. to 10s. 6d. per ton. Thus the Tyne maker was relieved in the most unexpected way, and enabled to carry on the trade in spite of ever growing difficulties. The method adopted by Messrs. Bell Brothers, Limited, was followed by others, and to-day the output of salt on the Tees reaches from 2,500 to 3,000 tons per week, of which nearly half is made by the pioneers of the trade. The total consumption of the Tyne being about the quantity we have just mentioned, and the output of salt tending to increase, other markets will have to be found. India and the Baltic seem likely to afford profitable outlets. At all events, an important industry has been established, and we may rest assured that no effort will be wanting on the part of those engaged in it to develop it to the fullest extent possible.

GEOLOGY OF THE SALT DEPOSITS.

So much has been written about salt lately that we may leave the question here. The geology of the salt deposits is full of interest. The extent of the bed, its limits to the north, and other cognate questions are matters of deep import to those engaged in the trade, but their discussion would involve us in problems of a most complicated character, of which the solution will only be found when our knowledge has been much enlarged.

THE USE OF SULPHUR.

We mentioned when describing the Leblanc method that sulphuric acid was employed in the

manufacture of soda. Before we conclude we must devote a short space to this part of the subject. At the time when Leblanc invented his process, and for many years afterwards, sulphuric acid was obtained by burning native sulphur brought from the Mediterranean. A gas known to chemists as sulphurous acid is the result of this operation, and it is necessary to cause this gas to combine with a further quantity of oxygen in order to obtain sulphuric acid. This is effected by causing the sulphurous acid gas to mix with air, steam, and a compound of nitrogen, in vast spaces, called chambers, enclosed in leaden walls. The sulphuric acid dissolved in the condensing steam flows out of the chambers and is utilised in the way already described. Till about 1855, native sulphur continued to be used for this purpose. In the early days of the manufacture, sulphur was subject to a heavy duty, but the Government of the day returned the amount paid on sulphur which was used in the manufacture of acid. One of the early manufacturers on the Tyne received as much as £1,500 in one year in this way.

THE SULPHUR BEDS OF SICILY.

In 1855, the King of the Two Sicilies, thinking to realise a handsome sum from an article of commerce drawn almost solely from his dominions, granted a monopoly of the sale of sulphur to a French company. The *concessionnaires* at once raised the price from about £5 to £12 a ton, to the consternation of the consumer. This action very speedily brought about the diplomatic intervention of Lord Palmerston. The King was compelled to rescind his concession, and in order to do so was obliged to pay a large indemnity to the grantees, and so his Majesty's meddling with the affairs of commerce ended; not, however, without having contributed, probably in no small degree, to bring about a most important change in the alkali trade. The soda makers had been forced to find sources of supply other than those of the island of Sicily, these being found in certain minerals in which sulphur is combined with iron and other metals. The collieries of Durham and the mines of Cleveland yielded these minerals in small quantities. A more abundant supply was found in Wicklow in Ireland, while Belgium and Norway also contributed their quota. From all these localities sulphur ore was obtained, but in the end the large deposits found in the south of Spain became the chief source of supply.

SULPHUR FROM SPAIN.

The existence of the copper pyrites of Spain had long been known, and indeed the ore was worked, not for its sulphur, but for the copper it contained. Piled up in large heaps, the sulphur was expelled by the action of the air, and the surrounding country desolated by the sulphurous acid gas produced. When the price of sulphur rose and sulphur ore was looked for to replace the native sulphur of Sicily, arrangements were made to transport the ore of Huelva and Tharsis to the Tyne and other alkali making centres, and to conduct the operation of expelling the sulphur under conditions and in localities where the resulting gas could be utilised for the production of sulphuric acid, instead of being

a bane to the neighbourhood of the mine. The residue containing copper and iron was handed back to the importers to be used for the extraction of the former metal. The residue of this second operation, a very pure oxide of iron, found its way into commerce under the name of Blue Billy, and was used in the manufacture of iron. The round of operations thus described still continues, and the net results of the King's action have been to exclude Italian sulphur from the soda trade altogether by substituting a much cheaper article for the production of sulphuric acid, to enrich the owners of the Spanish mines of sulphur ore, and to establish the manufacture of copper as an incident to that of soda ash by the Leblanc process. It would be hard to find a more striking example of the strange result which may, and most frequently does, ensue from the interference of Governments with the affairs of trade, nor perhaps one which illustrates better the axiom, too often lost sight of by those who clamour for such intervention, an axiom we may express in the words of Lafontaine:—

On hasarde de perdre en voulant trop gagner.

Let us, however, not attribute too much to the King and his advisers, for at the same time a new demand for sulphur was springing up. The vine disease was already making its ravages felt in the vineyards of Southern Europe, and sulphur was discovered to be a remedy. This and other causes would in all likelihood have made sulphur too costly for use in the alkali works, even without the ill-advised action of the Government, which fancied it could "control the sulphur market," as the modern phrase runs.

SULPHUR RECOVERY.

We have dwelt on the fact that the ammonia soda maker is obliged to throw away the chlorine, so precious to his competitor in the Leblanc process. This latter does not escape without a similar penalty. When he mixes sulphate of soda with chalk and coal and furnaces, his object is to compel his sulphur to relinquish its hold on the sodium. This it does by entering into combination with the chalk. When the furnace product is lixiviated, the hot water dissolves the soda and leaves a residue, called tank waste, which forms the evil smelling and unsightly heaps which surround a soda manufactory. This tank waste contains all the sulphur which has been used in the process. Many attempts have been made to recover the sulphur. Some have obtained a certain measure of success, and, no doubt, if sulphur were to advance seriously in price, further efforts would be made for its recovery. It is sufficient to mention the fact to complete the survey of the trade which we undertook to present to the readers of the *Chronicle*.

OTHER BRANCHES.

On the other branches of the chemical industry of the Tyne we have left ourselves no space to enlarge. Though comparatively unimportant, their rise, changes, fluctuations, and, in some cases, extinction, present matters for reflection as full of interest as those of the chief amongst them, with which we have dealt at perhaps too great length. Like other human affairs, there is in them

A tide
Which, taken at its flood, leads on to fortune.

The prudent opportunism taught in the passage where this line occurs has not been wanting in those who have founded these various trades. And if the tide of time has left certain wreckage on the banks of coaly Tyne, we may believe that her sons of to-day, no less sturdy and enterprising than their predecessors, will be ready, with the reflux of prosperity, to win the reward of labour by turning the circumstances of the moment to account. But if they find, as others have done, that the virtues of industry and perseverance must be their own reward, let them be content with having done their best, and when their turn comes to leave the scene of their endeavours, let them go feeling they have laboured earnestly.

Qui laborat orat.

MINES AND MINING.

[BY MR. J. B. ATKINSON, ONE OF H.M. INSPECTORS OF MINES.]

The Exhibition on the Town Moor is particularly devoted to mining. It is being held in the centre of a large mining district, and its conception and successful inauguration are largely due to mining men. The Chairman of the Executive Committee (Mr. J. Daglish) is one of our most advanced and scientific mining engineers. It must not be forgotten, however, that the operations of mining do not readily lend themselves to exhibitions. Great ability has been brought to bear to meet this defect by means of the construction of model mines on a large scale, the inspection of which by the non-mining public, will prove very instructive, while to the initiated the examination of the more portable mining appliances and specimens of minerals will be a source of great interest.

IMPORTANCE OF MINING.

One of the most marked features of our modern civilisation is the application to our wants of minerals; and this, taken in connexion with the colonisation of so many distant lands, enables Great Britain to hold her present proud position and to support the teeming population of these islands. We are, in fact, the workshop of the world. In the year 1886, there were employed in and about our mines 561,092 persons. When to this we add the persons engaged in manipulating and carrying on mining produce, and the persons whose employment depends on its many uses, it is not improbable that one-third of our population is dependent, more or less directly, on mining. Mining may be defined as the extraction of minerals from the earth by the aid of artificial light, the use of artificial light distinguishing it from the allied operation of quarrying. The manipulation, on the surface, of the mineral worked, such as screening and coking of coal, dressing and reducing metallic ores, does not properly belong to mining. Two great natural divisions of mining may be pointed out, each of which is illustrated by the model mines. 1st, the mining of a stratum or bed, as all seams of coal; and 2nd,

the mining of veins or lodes, as lead, tin, and copper veins. The mineral worked in the one case lies in a more or less horizontal plane, and in the other in a more or less vertical plane. There are also irregular shaped masses of ore, such as the Cumberland hematite iron ore deposits.

THE EXHIBITION COAL MINE.

The coal mine at the Exhibition represents the bottom of a shaft with workings in a seam of coal 6ft. thick and in a seam of less thickness supposed to have been thrown level with the thicker seam by a dislocation or *trouble*. In the 6ft. seam are shown headways and bords and an engine plane worked by an endless rope. One portion of this seam is a representation of stall work, not common in this district, but much in vogue in Wales. The thinner seam is supposed to be worked by long wall work. The roof is supported by props and planks and by stone pillars.

THE LEAD MINE.

The lead mine can be entered by an adit level, and two levels on the vein are shown, in one of the levels the ends are reproduction of a vein. The top of a sump with windlass is shown. The bottom of a shaft is reproduced, with two sets of pumps, a ladder way, and a drawing shaft. The timbering in the lead mine is of a slightly different character to that in the coal mine, and in the bottom level is an example of forepoling, necessary when driving in soft ground. An inclined road between the two levels for the passage of a pony is shown. A hopper for the loading of trams with ore is erected in the bottom level. Both these structures are built of wood, and give a capital idea of mining work.

SEARCHING FOR SEAMS OR BEDS.

The preliminary part of mining, the finding of suitable beds or veins, may be noticed. It will easily be seen that the operations necessary to discover a well-defined bed of coal or ironstone, and those necessary for the discovery of a variable mineral vein, will differ much in character. Experience has shown what are the accompanying rocks in each case, and in old mining districts the proximity of working mines affords much information. When speculators require, before embarking capital, more particular information, in coal mining it is usual to bore vertical holes, and carefully note the strata passed through. Boring by means of iron rods terminating in a chisel was known as early as the year 1618, and this system, that of percussion, holds its own to this day, and in the hands of experienced borers like Mr. Coulson, of Durham, gives good results. During recent years a rotatory system, known as the diamond borer, has been much used, and is shown at the Exhibition. The diamond borer is a cylinder of soft steel, in one end of which impure diamonds, known as boart, are inserted. The rapid revolution of this cylinder, by means of rods from the surface, causes the hard diamonds to cut away an annular-shaped hole in the rock; the solid core left inside the revolving cylinder is broken off at intervals, and, raised to the surface, affords excellent evidence as to the rocks passed through. Coal being so much softer than its enclosing rocks cores from coal seams are apt to be much fractured,

and at the most important time the diamond boring system does not always give satisfactory results. A new system of boring through soft rocks to known beds by ordinary steel tools has been introduced into England by an American company who have put down some holes to the Middlesbrough salt with marvellous celerity. It does not appear that this system of boring has been applied to the exploring of an unknown country.

SEARCHING FOR VEINS OR LODES.

In the discovery of veins or lodes a vertical bore-hole would be of little use, and horizontal boreholes of sufficient length not being possible, it is usual after inspecting all the ravines for indications of a vein, to drive across the supposed course of the vein in the solid rock, or to dig trenches on the surface. Water is sometimes dammed back and allowed to sweep away the clay and soil in a sudden torrent, sometimes disclosing a vein. This is called "hushing" in the North of England. In Cornwall, the divining rod, a hazel stick supposed to vibrate when near a vein, was used at one time by credulous persons.

METHODS OF WORK.

The dislodging of mineral from its native bed is accomplished either by manual labour, by explosives, or by machinery. Many coal seams are worked altogether by manual power, the tools used being picks, levers, and wedges. Picks have been improved of late years to the extent of adapting one shaft to suit several heads, and considerable ingenuity has been exercised in devising firm modes of attachment. Levers, locally known as pinches, are little used in working coal in this district, but are more used in stone work. Wedges are either simple, and driven forward by mells or hammers, or compound, and here manual power applied to a lever or wheel urges forward the wedge under suitable mechanical arrangements, so as to exert great rending force. Several of these wedges are exhibited; such as Asquith and Ornsby's, Hall's, and Ramsay's. Some years ago a compound wedge, devised by Mr. Bidder, in which the principle of the hydraulic ram was utilised, was tried at some collieries in the North. It cannot be said that these wedge machines are as yet commercially successful; the growing dread of the use of gunpowder in some coal mines is, however, causing much attention to be paid to perfecting them.

THE USE OF EXPLOSIVES.

Where explosives are used the method invariably employed is to drill a hole and place the explosive at the end of it, confining it further by stemming or tamping. In the case of shots in coal the mineral is undercut, and sometimes cut at one side, before using the explosive. In harder mineral the explosive sometimes does all the work. The boring of holes may be performed by jumpers: here only one tool, a drill, weighted at the non-cutting end, is repeatedly urged forward by hand. Another method is using a single-handed drill and drilling hammer. The miner holds and turns the drill with one hand, striking blows with a hammer held in the other. Double-handed holes are where one miner holds and turns the drill, one or more men striking with heavy hammers. Of late years, and

more particularly in Northumberland, rotary hand-drills have become common both for holes in stone and coal. These drills, of which some examples are exhibited, require a stand, and are worked by one or two men. A peculiarity of hand drilling by percussion in stone is to produce triangular holes; this is objectionable when powder is required to be used in round cartridges, but has the effect of causing the explosive to cut more. The drilling of holes in sinking shafts and in working hard mineral such as the Cleveland ironstone is sometimes done by machines worked by steam, compressed air, or water. In Cornwall, where very hard rocks have frequently to be penetrated, this system is making rapid strides; and in Cleveland Mr. Walker has devoted much attention to the matter, and Mr. A. L. Steavenson has applied water power to actuate machine drills with great success.

SHOT-FIRING.

The firing of the explosive may be by the simple application of flame, as in the case of gunpowder, or in the case of dynamite and allied explosives which will not explode on the application of flame only, a detonating cap is necessary. When holes are charged with gunpowder in dry mineral, the charge is fired by means of a straw or squib filled with gunpowder, and placed in a small hole left in the stemming by the withdrawal of a pricker. A match, consisting of a small piece of candle or a rag smeared in tallow, is arranged so as to ignite the powder in the straw after the miner has retired to a place of safety. Sometimes "touch-paper" is used, more particularly when the shot is fired where safety lamps are in use. The touch-paper is then ignited by a thin wire inserted through the gauze of the lamp, and rapidly withdrawn when heated. When gunpowder is used in wet ground, the hole is either lined with clay, if the powder is loose, or it is enclosed in pitched cartridges with fuse attached. When fuse is used no pricker is necessary. Explosives requiring detonation are always exploded by a cap attached to fuse. Bickford, Smith, and Co. exhibit specimens of fuse, and also a method for exploding several shots simultaneously by means of ordinary fuse. By means of water-tight fuse and explosives, such as dynamite, which are not affected by damp, shots can be fired in wet ground as readily as in dry. Electricity is often used for exploding shots, and it offers these advantages—the ignition of the charge is absolutely under the control of the person firing it up to the moment of the blast; if a shot misses fire it can be approached at once; several shots can be fired simultaneously.

"SAFETY" METHODS.

In fiery and dusty coal mines the flame from an explosive is a source of danger, and various methods have been suggested to kill the flame, some of which are exhibited. Enclosing the explosive in water and firing by electricity has been attended with much success. Mr. Galloway exhibits wet moss tamping. It has been proposed to obtain explosive or rending force without flame, and the efforts in this direction have been the employment of anhydrous lime which, confined in a large drill hole, on the application of water develops pres-

sure during slaking. This system is represented at the Exhibition. Air has been compressed to many atmospheres and confined in metallic cases, these placed in the drill hole are fractured by suitable means and large pressures set free. The use of liquid or solid carbonic acid has been suggested, also to enclose finely-powdered zinc in a drill hole and inject sulphuric acid so as to set free hydrogen.

COAL-CUTTING MACHINES.

The coal miner either dialogues the coal altogether by his pick, or prepares it by under and side-cutting for the use of explosives or wedges. This part of mining has been accomplished by coal-cutting machines, the motive power being compressed air. These machines have not been commercially successful, although in some cases they have been said to have paid their way. No such machine is at present in use in the North of England. The action of the miner's pick has been reproduced in some; others are slotting or sawing machines. Colonel Beaumont has invented a machine for boring or cutting out the Channel Tunnel. It excavates the full size. The rock it is proposed to penetrate is, however, very soft, and it is doubtful whether it would work satisfactorily in harder ground. Although attempts to mine by machinery are not altogether successful, an example in the North of sinking shafts by machinery may be mentioned. When Mr. Daglish, the Chairman of the Executive Council found that the winning of the Marsden Colliery, with which he was entrusted, was going to prove more difficult than was anticipated, owing to enormous feeders of water in the magnesian limestone, he introduced the Kind-Chaudron method of boring the shafts through the water-bearing beds by machinery, and the operation was most successful.

METHODS OF HAULAGE.

After the mineral has been detached from its native bed and filled into carriages, its conveyance to the surface is necessary; and methods for this end are well illustrated at the Exhibition. In coal mines, where 1,000 tons per day are frequently brought to the surface up a single shaft, the question of carriage is one of much more importance than in metal mines, where the quantities dealt with are much smaller; and, as a consequence, the carriage of mineral in metal mines is rather behind the age. In our collieries, the terms "barrow-way," "tram-way," and "rolley-way," still in use, recall older methods of carriage. The coal used to be carried on the backs of bearers, or was drawn in kibbles or sledges, planks being laid down to make the transit easier; barrows were used. Corves made of hazel rods long held their place. A corve is to be seen in the coal mine. By gradual steps the conveyance of coal underground attained its present stage, which may be illustrated best by following a tub of coal from the face to the surface.

The hewer at the face fills a tub of wood or iron, and carrying from 6 to 14 cwt. of coal; from the face to the flat, a distance seldom exceeding 300 yards, it is either pushed by a hand putter or drawn by a putting pony, in charge of a pony putter. At the flat several tubs are coupled together and form a "set," which is drawn by a horse or strong pony in charge of a driver to the engine land-

ing. Here several sets are coupled, forming a "run," which is drawn by a rope along the engine plane to the bottom of the shaft. The face is sometimes three miles from the shaft. The inclination of the seam of coal affects the question of carriage. Thus, if the seam is level, horses may economically perform much of the haulage. If it is inclined the rise coal may be worked by self-acting inclines; the full tubs running to the shaft afford power, applied by a rope attached to them and passing round a sheave, for drawing the empty tubs into the mine. If the road dips from the shaft, the empty tubs run into the mine of themselves, drawing a rope with them, which is used to haul the full tubs to the shaft.

HAULAGE BY MACHINERY.

The haulage of coal by machinery on level or slightly undulating roads is performed by two general methods.

1st. The main and tail rope system.

2nd. The endless rope or chain system.

Both these systems are illustrated at the Exhibition, and a general description is unnecessary. Some particular points in connexion with each may be noticed. The endless rope or chain system requires a double line of rails, and either a travelling way by the side for men and horses, or, what is better, a separate road for this purpose. The speed of the endless rope or chain is usually too slow to allow men to ride into the mine in the tubs with any advantage. The main and tail rope system requires a single road only, and when the face is far from the shaft the workmen are drawn in and out by specially provided trains. The power required for the endless rope or chain is less than for the main and tail rope system, and the wear and tear of the tubs is much less. The endless rope or chain system on an undulating road is assisted by the weight of tubs going downhill. The main and tail rope system can be applied to a crooked road without any special difficulty. This is a drawback to the other system. Some examples of modes of passing round a curve with the endless rope are shown at the Exhibition, both where the rope is on the top of the tubs, and where the rope is below the tubs. The endless rope may be applied as a self-acting system to roads inclining to the shaft, and any excess of power may be used in extending the rope on the level beyond the bank head. More tubs are required in working the endless rope or chain system than in the main and tail rope system. The greasing of tubs is often effected by automatic greasers fixed between the rails, as shown at the Exhibition. It has been proposed to apply grease boxes to tubs, as in railway waggon. Locomotives worked by compressed air for use in coal mines have been constructed by Messrs Lishman and Young, and their use has been attended with some success. The locomotive is furnished with a large vessel, which is charged with compressed air from pipes laid into the mine.

RAISING COAL IN SHAFTS.

Coal is invariably drawn up the shaft in the tubs which are run into a cage carrying from one to eight. While one cage ascends with the full tubs, another descends with an equal number of empty

tubs. These cages run in wood or iron guides, the latter sometimes being ropes. The winding engines are usually direct acting, and of late years double engines have been preferred. The cages are often fitted with disengaging hooks; if the engineman fails to stop the engine when the cage reaches the surface it ascends to an arrangement near the pulleys, when the rope is disconnected and the cage is left hanging. Walker's hook, exhibited, is often used for this purpose. Some cages are fitted with an apparatus for "clutching" the guides and preventing the fall of the cage in the event of the rope breaking.

WIRE ROPES.

Ropes used at collieries are almost always iron or steel; crab ropes, for lifting pumps, &c., in shafts, are often of hemp, but even these are gradually being replaced by iron or steel ropes. Flat ropes are sometimes used for winding in shafts. Iron or steel ropes are usually made up of circular wires; ropes made of wires so shaped as to fit into each other and produce a solid section are exhibited. These ropes are very flexible, and are said to wear better than the ordinary rope.

METHODS OF VENTILATION.

The air in mines, if not replaced by fresh air from the surface, becomes vitiated and unfit for respiration, and refuses to support the combustion of lights; in the case of coal mines it sometimes becomes inflammable or explosive from the admixture of fire-damp. The variation in temperature between the air underground and that on the surface in most cases causes some movement of air in the mine. This is called natural ventilation, and is often sufficient for the purposes of metal mines. In coal mines artificial means for promoting a steady current of air through the workings are resorted to, and may be either furnace or machine ventilation. The furnace placed at the bottom of the upcast shaft heats the air in it, causing it to become lighter than the air in the downcast shaft, which in consequence passes into the mine. Mechanical ventilation has made great strides during recent years, and this notwithstanding the fact that it is in the deeper mines—now becoming more common—that the furnace gives the best results. Mechanical ventilators, very sparsely illustrated at the Exhibition, are applied to the top of the upcast shaft, and exhaust the air from the mine. They are of two kinds, centrifugal ventilators, as the Guibal, Waddle, and Schiele, and pump or varying capacity machines, as the Lamielle, Cooke, Roots, and Struvé. The fan exhausting the air from the model coal mine is a Schiele centrifugal ventilator. It is a small fan running at a high speed. The Guibal and Waddle fans are larger in diameter, up to 50 feet, running at a lesser speed. The use of steam jet in upcast shafts, or waterfalls in downcast shafts, is often resorted to as a temporary expedient for producing ventilation.

THE LIGHTING OF MINES.

The necessity for artificial light, a difficulty as easily met in metalliferous mines as lighting our houses at night, is one of great importance in the case of coal mines producing fire-damp. The flame of the illuminant is then so enclosed that while air

necessary to support combustion can reach the flame, flame cannot pass to the outside. The safety lamp is also used as the test of the presence of fire-damp. The principle of the safety lamp is well known, and all important improvements have been in the direction of making the lamp safe when exposed to rapid currents of inflammable air. The genius of inventors has also been applied to devising modes of locking the parts of the lamp and increasing its illuminating power. Some lamps of the "protector" type are constructed so that the miner cannot open the lamp without extinguishing the flame. Some have shut off appliances added, so that the miner when enveloped in an inflammable mixture can extinguish the lamp at once by cutting off entirely the supply of air. Two methods of relighting lamps without unlocking them have been devised, one by electricity and one by striking a match inside the lamp. The electric light has already been applied to the lighting of mines in the vicinity of the shaft. A portable electric lamp, devised by Mr. Swan, is almost a practical success. The glow of the carbon filament supplying the light being entirely cut off from the surrounding air, the safety amongst fire-damp of such a lamp is far greater than any form of safety lamp hitherto in use, and will probably solve the safe lighting of our mines. Mr. Swan's lamp is fed by electricity from a dynamo, the battery being a secondary one. Lamps attached to primary batteries are often brought forward, and may possibly be preferred to the secondary battery system.

THE WATER DIFFICULTY.

Water is a source of great trouble and expense to the miner; it is, however, rarely met with, in large quantities in deep coal mines. In sinking shafts it sometimes issues in such quantities as to compel their abandonment. Up to a moderate amount in shaft sinking, it may be drawn in buckets; if in larger volume a set of pumps follows the sinking operations, and various devices are used to allow for the continual extension of the column. It is usual after passing through water-bearing beds to suspend the sinking until they are tubed off by cast iron tubing, or in some cases cement walling is inserted. Instead of employing an engine on the surface to pump water from a sinking pit, a force pump has in some cases been lowered on a scaffold, steam being supplied by pipes from the surface.

The bed of coal to be worked, if producing water, is worked to the rise of the pits with no difficulty, but dip coal of a water-bearing character is often very troublesome to work owing to the difficulty of applying power for pumping the water to the shaft. A syphon may be applied in some cases. The water is sometimes led out in water tubs. Hand pumps or pumps worked by horses are used. Pumps are worked by steam from the surface or from boilers at the shaft bottom or in the workings. Compressed air is used; and where a high pressure is available water is used. Ropes for hauling purposes are often also applied to pumps, and sometimes ropes are used for no other purpose.

ROOF FALLS AND TIMBERING.

The miner works under a roof which is ever

liable to fall, and the most prolific source of fatal accidents is falls of ground. Methods of timbering may be seen in the model mines. Cast iron props or supports for the roof have been tried, and in some case old iron rails have been used both as props and as girders. Sheet iron cylinders filled with sand have been suggested. Arching roads with bricks is very common in coal mines. The quantity of timber used in our mines is very great.

MARINE ENGINEERING.

[BY MR. WILLIAM ALLAN, SUNDERLAND.]

The idea embodied in the Great Exhibition of 1851, and in all those held throughout the world since, was—Progress. Every section of an exhibition is the expression of advancement in that particular branch. The various exhibits are simply the mile posts of progress. The extent and value of this progress could only be realised by the onlooker viewing a method or a machine of the past, and contrasting it with those of the present. A congeries of things in past use, together with present day types or forms, would no doubt be exceedingly interesting and instructive, but it would virtually be impracticable, while the expense entailed would be enormous. We must, therefore, content ourselves with historical records in making comparisons with the past and the present.

The various sections in our Jubilee Exhibition show our progress up to date in each particular exhibit. The section of marine engineering is specially marked by progressive evolution. The visitor to this department may naturally ask: If these are the modern types of marine engines, what were those of the past? To enable one to form a better idea of the marine motors of the past, *versus* the present, we must go back to the period when that wonderful mechanical genius, the Marquis of Worcester, lived (*circa* 1660). In the troublous times of the Cromwellian period he was busy, though a prisoner in the Tower, with his remarkable inventions, which he afterwards compiled under the title of "A Century of Inventions." In this hundred inventions of his he not only anticipated the present-day quick-firing guns, torpedoes, shorthand writing, flying machines, the electric telegraph, &c., &c., but the propulsion of boats by paddles. His discovery of the "fire water-work" or semi-omnipotent engine," as he called it in his patent, which he had in practical operation for a number of years, is his greatest invention, and unquestionably places him as the true inventor of the steam engine—that engine from which Watt's is lineally descended. From that date various applications of the use of steam and improvements in the mechanism employed took place. The energy was there, but how to apply it successfully was the question with many. Newcomen's and Savery's names stand out prominently in the list of renowned improvers. A hundred years or so after the discovery of the Marquis of Worcester James Watt took out his first patent (1769) for the separate condenser,

closed cylinder engine. This, together with cutting off the steam before the end of the stroke, is James Watt's greatest and unimproved invention. The problem was now solved. It only remained for its broader application and improvement in details to complete the revolution begun and give an impetus to the commerce of Great Britain, which to-day is unparalleled. The mastermind of Watt was primarily directed to the manufacture of pumping engines for mines, but there is no doubt that he saw the adaptability of his discovery for the propulsion of vessels, but

THE FIRST STEAM-PROPELLED PADDLE BOAT

was invented and successfully tried on Dalswinton Loch, near Dumfries, in 1788, barely twenty years after Watt's first patent, by Patrick Miller, the proprietor of the estate. This gentleman was a remarkable man, of a mechanical genius, and had spent his fortune in trying to propel boats by means of paddles turned by a steam engine. In 1793 Miller ran a little paddle steamer on the Thames, but London then was dead to the invention. Miller was ruined, and died broken-hearted. It was his Dalswinton boat, lying neglected at Port Dundas, near Glasgow, that suggested to Henry Bell, of Helensburgh, his better planned mechanism. Previous to this, however, one John Bell, a joiner, who had been Miller's workman or assistant, had emigrated to New York. There he met in with Fulton, and imparted to him the principle and arrangements of Miller's boat. Fulton got a vessel built in New York and his engines made in this country. In 1809 Fulton's boat was lucratively plying on the Hudson River, a miracle to and the boast of the Yankees. To Patrick Miller belongs the honour of being the father of steam-propelled vessels. We remember reading a story of the first trial trip of this the first steamer; it was therein stated that Burns, who then occupied the neighbouring farm of Ellisland, belonging to Miller, and young Brougham, then a student at Edinburgh, were on board of the little craft as it ploughed its way over Dalswinton Loch. If the story be true, what an opportunity Burns missed in not recording the experiences of that day in immortal verse. In 1812, Henry Bell built and launched the "Comet" on the Clyde. The trips of this vessel were from Glasgow to Greenock and back. The "Comet" was the first British steamer plying commercially. Its success induced others to embark in similar enterprises. From that date paddle-propelled vessels increased. The engines then were of the side lever type, having huge cast iron frames of Gothic window design, supporting the crank shaft. The boilers were then constructed either of cast iron or small forged plates; their form was either circular or rectangular flue. The pressure of steam was 7 lbs. to 10 lbs., and they were supplied with salt water. The space occupied by this type of engine and boiler was somewhere about one-third of the ship's length, while the consumption of coals was something like 7 lbs. per horse power per hour. During the reign of this arrangement of marine engine, active brains were at work endeavouring to discover a less cumbersome or simpler type, or one which would occupy less space in the vessel. A step in this direction was

made in Maudsley's direct-acting double cylinder paddle engine. Then came a grand design, making, in every sense of the term, a beautiful engine, and one which occupied less length space. This engine, known as the oscillating paddle, was first fitted into a steamer called the "Aaron Manby," in 1821. Maudsley fitted the "Endeavour" in 1829 with oscillating engines. It remained for John Penn, however, to bring this type of paddle engine into commercial repute. We have this type of engine still employed in our river steamers. Mr. Penn's first oscillating engines were built in 1837. The objections urged against this type of engine were successfully combated by Mr. Penn, the result being that the side lever and other types of paddle engines gradually fell into disuse. During these forward improvements in paddle engines, another genius was at work, whose aims were no mere detail improvements. A new mode of propulsion was the day-dream of his being. The annihilation of paddle wheels and their engines, with all their shortcomings, was ever present with that sturdy genius, Francis P. Smith, the practical inventor and introducer of

THE SCREW PROPELLER,

which was fitted into the "Archimedes" in 1840. Its success was undoubtedly. From that day a change of ideas gradually filled the minds of marine engine builders. Although much opposition was given and many doubts expressed as to its adoption, the screw nevertheless held its own, and gradually displaced the paddle. Paddle-wheel steamers went out of fashion. The advantages possessed by the screw-propelled vessel commanded themselves to shipowners and to the Government. Engineers began to plan suitable engines for the new motor. Many were the designs adopted, but none found so much favour, or occupied less space, than the two cylinder inverted direct-acting common condensing engine. This arrangement seems to have been the outgrowth of all previous designs. Notwithstanding the manifold advantages obtained by the introduction of the screw propeller, something else was yet required. The *bete noir* of boiler incrustation existed. The work done was still costly in fuel. Many had mooted the question — Cannot marine boilers be fed with fresh water? James Watt perceived the benefits to be derived from surface condensation, but failed to apply it. In 1821, David Napier tried an experimental surface condenser in the "Post Boy," but abandoned the plan. In many minds the idea existed for the consummation of this desideratum, but it remained for Samuel Hall, of Basford, to solve the problem of

SURFACE CONDENSATION,

by patenting in 1835 his arrangement of surface condenser, and applying it with success to the engines of the "Wilberforce" in 1837. Like Patrick Miller, Samuel Hall spent his fortune over perfecting the surface condenser, and died in absolute penury. This grand but ill-requited genius of engineering was the father of one of the greatest improvements of the steam engine. The principle and *modus operandi* of surface condensation as planned by Hall remains unchanged. The long period of 20 years elapsed

before surface condensing came into repute. Ignorance and prejudice almost killed progress. In 1860 few vessels were fitted with surface condensers. In 1858 we find the "Royal Bride," built by Randolph and Elder, fitted with a surface condenser below the stern tube space, an ingenious but unpractical arrangement. In 1860-5 a sudden demand arose for surface condensing marine engines. The cost of fuel and expense attending the internal cleaning and scaling of boilers, overcame the existing prejudices. The sense of safety implied in having clean boilers also contributed to the desire for surface condensation; we find, therefore, that in 1865 the surface condensing type of marine engine came rapidly into use and replaced the common condensing type. The consumption of fuel which a few years previously had been from 5 to 7 lbs. per horse per hour, now fell to 3½ lbs. As the desire for still less consumption began to be prevalent, higher pressure and greater expansion became necessary. With surface condensation encouragement to use higher pressures of steam was given, hence we find engineers using pressures of from 40 lbs. to 50 lbs. in 1865. As the engines using this pressure of steam were generally fitted with expansion valves and their multifarious gear, which was often a source of trouble and expense, it occurred to John Elder that the Woolf or compound action could be applied to marine engines. Therefore we find in 1854 John Elder fitting a four cylinder engine in the Brandon. In 1855-6 the paddle steamers Valparaiso and Inca were fitted by him with four cylinder, diagonal common-condensing engines. In 1858 his Royal Bride was fitted with four cylinder inverted, direct-acting common condensing engines—this vessel had his first surface condensing contrivance in the afterpeak. To Mr. Elder belongs the credit of having pertinaciously clung to and adopted the compound engine for marine purposes. Nor was he slow to perceive the necessity for higher pressure of steam, which, in conjunction with surface condensation, he began to adopt with such success as to reduce the consumption of fuel in his compound surface-condensing paddle engines of 1864, to 2½ lbs per h.p. per hour. This wonderful result was for a time doubted, but the fact was incontrovertible. The demand for higher pressures and compound surface-condensing engines began in 1866-7, when cargo-carrying steamers came to be extensively employed in general trading. The inverted type of marine engine was found specially suitable either for compounding or designing *a priori* as a compound engine. The pressures of steam then employed ranged from 60 lbs. to 75 lbs. The consumption of coal fell to 2½ lbs. per h.p. per hour. In some instances, where a particular form of boiler was employed, a higher pressure was used. For a number of years the steam pressures generally in vogue remained stationary. By the adoption of the circular boilers the pressures gradually crept up till 100 lbs. was reached. The performances of the engine improved with every increase of pressure. Shipowners demanded less consumption of fuel still. The great competition which had arisen in cargo-carrying tended to reduce the dividends. They clearly saw that if vessels were to pay

they must be propelled at the least possible cost. To the credit of a Tyne shipowning firm, Messrs. Dixon, Robson, and Co.

TRIPLE EXPANSION ENGINES

came first into vogue commercially. If we mistake not, Mr. Alexander Taylor designed and used the first circular boiler for 150 lbs. pressure. The engines he designed were two crank, three cylinder, the high pressure and intermediate cylinder being on the forward crank; the low pressure cylinder on the after crank. The performance of this engine was remarkable, the consumption being 1½ lbs. per h.p. per hour. In 1883-4 the demand then was solely for triple-expansion engines; in many cases the ordinary compound engine was supplied with a h.p. cylinder and new boilers, so as to reduce the consumption. The largest vessels now being built both for the mercantile marine and Royal Navy are all on the triple expansion system. In some cases quadruple expansion engines have been fitted. In general terms it may be said that one-horse power can now be got from a marine engine for one and a half pounds of coal per hour. Fifty years ago 7 lbs. of coal were required. The progress in marine engineering during the last half century is clearly marked by the following epochs:—

1. The gradual supercession of side lever paddle engines by oscillating engines—1837 and upwards—an improvement by John Penn.
2. The application of the screw for propulsive purposes and gradual overthrow of paddle engines—1846 and upwards—an improvement by Francis P. Smith.
3. The application of surface condensation to marine engines, 1835 and upwards. An improvement by Samuel Hall, of Basford.
4. The application of the Woolf or compound system with higher pressures to paddle-wheel vessels, 1854 and upwards. An improvement by John Elder.
5. The application of the same system to screw-propelled vessels with inverted engines—1858 and upwards. An improvement by John Elder.
6. The application of circular multitubular boilers for 150 lbs. pressure and upwards, with triple expansion engine—1882 and upwards. An improvement by Alexander Taylor, of Newcastle-on-Tyne.

These six stages of progress are, broadly stated, the *real* improvements which have taken place, and which have had a marked influence on the commerce of the Empire. During the development of the marine engine to its present condition, many improvements in collateral branches have taken place. Forgings of almost any size can now be made. Plates of any thickness suitable for the boilers can now be rolled. Machines of the most accurate description can now be had. Riveting can now be done by hydraulic machines. Steel is gradually chasing iron from the field, and a host of other mechanical applications for the production of first-class engines have emanated from the brains of our mechanical engineers. Whenever a stage of progress has been reached its requirements have been met. We may naturally ask: In what direction shall the next development of the marine engine lie? Shall we yet discover in the infinite expanse of science a new motor? Shall electricity furnish us with an easily manipulated power before which steam shall vanish? Is it possible that we may gene-

rate, by chemical admixture, a gas which shall drive engines, or, by acting directly on the water or atmosphere, propel a vessel or locomotive without the aid of machinery save the gas generators? Shall the combustion of petroleum in boilers supersede coal? These are queries which no doubt steal over the minds of our mechanical scientists. The dreams and theories of to-day are often the facts of to-morrow. We can only hope that our future progress shall be as beneficial to humanity and commerce as our past has been. Improvements grow slowly. Science is a silent worker. Coming times shall witness other and greater developments in marine propulsion, and no doubt in an Exhibition of 1987, the progress there shown will be as marked as the Exhibition of to-day.

JUBILEE EXHIBITS.

The district of and around Newcastle has been famed for the production of engineers, whose works and improvements still attest the grasp of their genius, and whose names are indelibly recorded in the Valhalla of Science. They were no dull-brained laggards in the path of progress, but seemed ever bent on improving the steam engine, both for land and marine purposes, with a pertinacity of effort peculiar to North Countrymen. Hence it follows that the banks of the Tyne are ever sacred to the earnest worshippers of the steam-god; and it is with feelings of pride and expectancy that we visit the Exhibition now open, and wend our way to the section devoted to Marine Engineering, mentally asking ourselves—Do the present-day Tyneside engineers maintain the glory of their forefathers and the district? Our query is answered as we gaze upon

MESSRS. HAWTHORN, LESLIE, AND CO.'S

Example of a triple-expansion, inverted, direct-acting, surface-condensing, high-speed engine, which is sure to attract the eyes of all visitors to this section. These engines in design, workmanship, and proportions are indeed unequalled, and impress the beholder with a sense of beauty which would seem difficult to obtain from any mechanical combination, but which in this engine has been attained to such a degree as to present a picture on which every scientific eye will gaze with admiration. Lightness combined with strength, every part easy of access, and correct centre-line fitting are the salient characteristics of this *multum in parvo* specimen of marine engineering. Contiguous to this inverted engine we behold a right royal model of this firm's famous double triple expansion high-speed engines for warships. The design and arrangement of this engine are sure to satisfy the most captious critics. Marshall's noted valve gear arrangement simplifies the details wonderfully, and gives a completeness to the whole engine which few attain. This model is a reflex of those mighty engines—the largest in the world—of 25,000 h.p., now being constructed for the Italian ironclad "Sardinia." Little wonder at the success and reputation of this old-established and world-renowned firm in warship and mercantile marine engines. The true elements of progress, simplicity and efficiency, are here apparent, and show that the master hand and head

of experience have been at work in their design and details. The evidences of geometrical engineering are fully apparent in this grand combination. We see a reality, and by such realities is this firm placed, and justly so, in the very van of all marine engineers. On leaving these masterpieces of skill and art, we wend our way to the stand of

MESSRS. PALMER AND CO., JARROW.

This celebrated firm is represented in marine engineering by a complete working model of their well-known triple-expansion inverted direct acting surface condensing engines, as generally fitted by them in their merchant steamers. In design and arrangement it is of the highest order, and possesses many points which command attention. Every detail has been carefully thought out and arranged so as to produce an engine which at sea will give little or no trouble. The air of solidity and amplitude in the model would be rendered more impressive when one gazed on the monarch of which this is the prototype. The skilful engineer is apparent in its every detail, and we congratulate the firm heartily for the pleasure afforded in viewing such a neat and compact model. The beautiful photographs of the horizontal triple-expansion engines for H.M.S. "Orlando" and "Undaunted," adjoin, and show at a glance that in such arrangements this firm is "second to none." Opposite to Messrs. Palmer's exhibit we see

MESSRS. ERNEST SCOTT AND CO. S

exhibit of a compound surface-condensing high-speed yacht engine. This go-head firm deserves special notice at our hands for such a highly-finished, compactly-designed, "natty" engine. In design and arrangement it is all that one could wish; amply surfaced in its working parts, handy and getatable, it is a splendid sample of the work turned out by a rising firm which will certainly secure wide recognition yet for this class of engine. The fan engines and pumps shown also are specially noteworthy. Adjoining this exhibit we observe

MESSRS. SHANKS AND CO., ABBROATH,

have a very cleverly-designed and arranged example of their well-known Triple Expansion Yacht Engines. This old-established firm are *facile princeps* at this type of engine. Highly finished, capitally proportioned, and possessing a Scotch solidity of arrangement, which betokens a fitness for hard work, these engines are behind none of their kind.

We have feasted our eyes on the engine exhibits, and have purposely refrained from alluding to the

ENGINEERING OF BOILER BUILDING.

The proud position of showing the great progress made in the manufacture of marine boilers for modern pressures has been left to

THE WALLSEND SLIPWAY AND ENGINEERING

COMPANY,

whose exhibit of a circular steel boiler, 14ft. 6in. in diameter, for a pressure of 160lbs, strikes the eye and rivets the attention of the visitor. This magnificent specimen of boiler engineering is marvellous. The shell consists of 4 plates, $1\frac{1}{2}$ inches in thickness; these plates are double but strapped; the end plates are the *ne plus ultra* of flanging work, smooth, true, and square. The

furnaces are of Fox's corrugated type ; but, wonder of wonders ! there is not a hand-hammered rivet in the whole boiler, and no rivet heads are caulked. There is not even a hammer mark to be seen. Like the Temple at Jerusalem, this boiler must have been built in silence. This perfection of workmanship could only be attained by having all the holes in the shell machine drilled, and employing those hydro giants—Tweedell's rivetters, which are slung about the boiler, silently showing " how it is done ; " each of their massive arms capable of squeezing up with ease the great rivets used in securing the plates, and making each rivet head exactly alike, virtually miniature helmets. Shades of the dead pioneers of engineering ! Little did your material embodiments dream of such workmanship, and such progress in the field of your hopes. Ye were proudly satisfied in your efforts, with a cast iron tube for a boiler, or an equally unsafe and semi-secured wrought iron shell for 5 or 6 lb. pressure. Now here are strength and safety for a pressure of 160lbs in a steel shell 14ft. 6in. in diameter, and capable of giving out 300 horse-power. Let it be said that this is no mere " Exhibition " boiler, as such workmanship is the keystone of the business of this justly famous and enterprising firm, who, with no " prentice hand," hold the reins of progress, and move on with, nay ahead of, the times in all they undertake. It was this firm who in 1882-3 undertook to construct circular marine boilers of large diameter for Taylor's triple expansion engines, and whose progressive management is now endeavouring to solve another problem, viz., the use of liquid fuel for steamships. Verily we have engineering pioneers still in our midst. What shall be said of them and their works a hundred years hence ? The little working model of this firm's celebrated compound engines will attract every one. It is the *acme* of model-making, a perfect masterpiece of artistic finish and manipulation, showing the engine in every detail. How such miniature work could be accomplished by the hand of man is a veritable wonder. Adjoining we note

MESSRS. BAIRD AND BARNSLEY'S

capital example of compound surface-condensing yacht engine, a well-proportioned finely-finished job, simple and handy, having an engineer-like look which is commendable. We have left ourselves little space for a detailed description of the many

HELPS TO PERFECTION

or accessories of the marine engines and boiler which are exhibited. We must, however, direct the visitors' attention to the following mechanical victors and their noble trophies.

THE DARLINGTON FORGE COMPANY

show some of their beautifully-machined and faultless forgings in steel. This far-famed firm have two massive crank shafts and a plain shaft, which, for homogeneity and intrinsic merit of material and beauty of finish, will command special attention and praise from all observers.

THE TYNE FORGE COMPANY

exhibit two crank shafts which, in shop parlance, are " bad to beat." The material is spotless, show-

ing careful manipulation and selection, while the finish is admirable. From shafts we turn to

THE LEEDS FORGE COMPANY'S

trophy of Fox's true-corrugated furnaces for boilers, and locomotive side frames flanged in one piece. The material of which these furnaces is made can be " tortured and twisted " in any manner without yielding or losing its inherent strength, while the workmanship is unique and defies criticism. They are the embodiment of lightness and strength, and are specially adapted for high pressure boilers. Adjoining we note

THE FARNLEY CO.'S

examples of flanged plates and skew-corrugated furnaces on Fenby's patent. The flanging of the plates is the perfection of the art, while the skew-corrugated furnace is a striking departure which for merit and suitability will, we think, hold its own with its kindred. Contiguous we have

MESSRS. CAMMELL AND CO.'S

splendid collection of their steel manufactures in flawless propeller blades and perfect crank shafts, on which every practical eye will look with the pleasure arising from viewing the ultimate of good material and workmanship. Opposite we notice

JOHN BROWN AND CO.'S

whose splendid work in flanged plates for boilers is really unapproachable, boiler ends, boiler fronts, &c., all alike showing skill and care of the highest order. This firm also have a specially rolled ribbed furnace which is a capital adaptation of the principle of strength combined with lightness. After surveying the progress in steel plate manufacture, we turn to

MESSRS. RIDLEY AND CO.'S

grand exhibit of steel castings. Soundness and purity are the dominating characteristics of every item seen, and bespeak a thorough knowledge of the art. Opposite we observe

JOHN SPENCER AND CO.'S

remarkable collection of steel castings in all shapes and forms, and for almost every purpose—from crank webs to locomotive driving wheels, from an axle box to an anchor (Wasteneys Smith's), nothing but sound steel. The onward march of this famed firm in the development of steel castings has been unequalled, and we do not begrudge them their well-earned and world-wide reputation as *sanspareil*, when we gaze upon their work and scarcely find a blown hole therein. One specialty of this firm is the casting of the steel webs and pin combined of.

JOHN DICKINSON'S PATENT CRANK-SHAFT,

which may be seen opposite to Messrs. Spencer's stand in a beautifully finished and complete steel crankshaft for a 200 h.p. triple expansion engine. This arrangement of built crankshaft is unquestionably the premier of all shafts, being the safety shaft *par excellence*, a quality every seagoing engineer can truly appreciate and every shipowner sleep soundly over. For any marine engine, but especially for those of large power, it is undoubtedly invaluable. From plates and shafts to pumps is not a long way in marine engineering, and as no

marine engine is perfect without a perfect pumping arrangement, we note with pleasure

THE WORTHINGTON PUMPS,

which, for practical finish of parts and a do-my-duty appearance, at once command attention. These pumps are invaluable on board ship, either for circulating pumps, water ballast pumps, or for discharging petroleum oil-tank vessels. The direct action of these pumps and the thoroughly scientific basis of their design place them in the van of all such pumps. The impressive exhibit of

HENRY WATSON AND SONS

will be certain to command attention, as such a collection of pumps is rarely seen. The Oriental pumps, Navy pumps, and ventilating valves, &c., are all alike masterful in design and workmanship. The very "look" of each exhibit is a sufficient attestation of the celebrity of this old-established firm, whose repute is solely based on such workmanship and material as are here shown. Not far off we observe

MESSRS. EVANS S., WOLVERHAMPTON,

array of pumps, all of which are worthy of careful attention. Their arrangement and details are really admirable, their workmanship is unassailable, we would think them capable of capital performance in pumping duty. The same may be said of

THE "COLCHESTER" PUMP (MUMFORD'S),

a very ingenious design combining fewness of parts with efficiency. The simplicity of this arrangement and their compact appearance render them specially applicable for all kinds of work, and will not fail to attract all interested in pumps.

We have gone over the section of Marine Engineering with much pleasure, and bear witness to the great progress each exhibit marks. This progress appears specially prominent in simplicity and lightness of designs, and the manufacture and manipulation of material in keeping with modern requirements. Well may "canny Newcassel" be proud of her engineers, those men whose labours have made her what she is, and whose worthy offerings at the shrine of Peace are shown to the public in this her Jubilee Exhibition of 1887.

SHIPBUILDING.

[By Mr. DAVID POLLOCK, author of "Modern Shipbuilding and the Men Engaged In It."]

Of the many-sided national prosperity which the Jubilee year of her Majesty's reign, and the great Exhibition organised in our midst to commemorate it, naturally suggests for our consideration, there is no direction, perhaps, in which progress is so marked as in that of steam navigation and its twin tributaries of iron shipbuilding and marine engineering. In view of the frequency with which the initial stages in this great movement have been recounted, and having regard to the appropriateness of confining ourselves on this occasion to the Jubilee period, we will not seek to deal with anything prior to 1837. Curiously enough this date takes us back exactly to the

time when the problem of steam navigation had been practically solved as regards lake, river, and coasting service, and when great preparations were being made to demonstrate the practicability from all standpoints of oversea long-distance voyaging. On the 19th July, 1837, the Great Western, the first steamer specially designed and built for, and afterwards regularly employed in the Atlantic service, was launched from Paterson's yard at Bristol. Although this remarkable vessel had to share the distinction of being the first to cross the Atlantic under steam with one or two earlier vessels and with the Sirius (built originally for service between London and Cork, and hastily adapted for a voyage to New York), she is nevertheless worthy of being remembered as the true pioneer in the Atlantic steam service.

So far back as 1819 the Atlantic had been crossed by a ship using steam, but only as an auxiliary to her sail power. This was the Savannah, which left the port of that name on the 26th May, and safely reached Liverpool, having used steam during 18 of the 25 days she spent on the voyage. Her paddle-wheels were constructed in such a way as to fold up and be laid upon deck when not in use. In 1829, also, an English-built vessel, the Curacao, of 350 tons and 100 horse-power, had made several successful voyages between Holland and the Dutch West Indies; and, further, in 1833, a steamship named the Royal William, built at Three Rivers, Canada, and subsequently sold to the Portuguese Government, made the one voyage from Quebec to London in 24 days, having been detained three days on the way. These efforts, however, were sporadic, and had none of the contagious influence which the subsequent success of the Great Western exerted. This remarkable vessel was built for the Great Western Steamship Company, and was the conception of I. K. Brunel, whose bold genius controlled the affairs of the company, and gave to the maritime world several of its most notable steamships. The Great Western was 212ft. in length, 35ft. 4in. beam, 23ft. 2in. in depth of hold, and registered 1,340 tons, old measurement. Her engines (on the side lever principle) were made by Messrs. Maudsley, Sons, and Field, of London, and were of 440 horse-power, the cylinders being 73 $\frac{1}{2}$ in. in diameter, with 7ft. stroke, and the revolutions twelve to fifteen per minute. The Sirius, it may be mentioned, was of 700 tons, old measurement, and had engines of about 300 horse power. She was 178 ft. long, 25ft. 8in. beam, and 18ft. 3in. depth. The two vessels arrived at New York on the same day, Monday the 23rd April—the Sirius in the morning and the Great Western in the afternoon—the former having started from Cork on the 4th, and the latter from Bristol on the 8th April, the passage thus taking 18 days and 14 days respectively. Their arrival at New York was hailed with immense acclamation by a vast concourse of spectators. And when it is considered that the event represented at once a triumph in steam propulsion, regarding the possibility of which much doubt and some positive disbelief had been expressed, and virtually reduced the distance between the Old World and the New by about one half, it will be seen there was good cause for enthusiasm. The whole distance

run from Bristol to New York by the Great Western was 3,125 knots, her average speed being 208 miles per day, or 8 1/2 per hour, consuming 655 tons of coal. The return passages were even more satisfactory. The Sirius started on the 1st May, and reached England on the 18th. The Great Western started on the 7th May, and was 14 days on the passage, though one was lost by stoppage at sea. She averaged 213 knots per day, or close upon 9 knots per hour, with a consumption on this occasion of only 392 tons: accounted for, no doubt, by the prevalence of westerly winds. The Sirius did not again cross the Atlantic, and she was either put upon her old station, between London and Cork, or despatched to London to open up steam communication with that city and St. Petersburg. The Sirius's place was taken by the Royal William, belonging to the City of Dublin Steam Packet Company, which a syndicate of Liverpool merchants despatched for New York on the 6th July, 1838. Her performances were much like those of the Sirius, and less satisfactory than those of the Great Western, whose second voyage was a greater triumph than the previous one. She accomplished the second outward passage in 14 days 16 hours, and the homeward passage in 12 days 14 hours, bringing with her the advices of the fastest American sailing ships (long the pride of the Atlantic) which had sailed from New York long before her.

We have dealt with what may appear excessive circumstantiality on these events, but as they mark the inauguration of deep sea steam navigation, and constitute a striking contrast to the state of things which obtains on the Atlantic to-day, these matters are worthy of the attention bestowed on them. We propose, indeed, entering upon a succinct historical survey of this service as affording in itself a more complete and connected epitome of progress in its practical aspects than any other single service that can be instanced; although, afterwards, we may have to point to other services for more striking illustrations of the economical and other aspects of this marvellous progress. Before entering upon this, it may be well to say a word or two regarding the oft-repeated story of the celebrated Dr. Lardner's prognostication in 1835 regarding the establishment of steam communication between England and America. He is almost always quoted as pronouncing the scheme of bridging the Atlantic by steamers "a physical impossibility," "utterly chimerical," and as likely to be accomplished as "a voyage to the moon." This manner of construing his asseverations is fallacious, and it is due to his memory as a scientist of the highest standing in his day to refute the error. That he did limit the size and power to which steamships might be evolved is true, having in his "Encyclopaedia" and elsewhere more than once committed himself to the opinion that no steamship would ever be able to make so distant a voyage as that of crossing the Atlantic, without re-coaling at some intermediate station. In this he was wrong; and it seems remarkable how a man of his undoubted calibre should have shut himself up to so restricted a view of the possibilities of steam navigation. However, he never stated, as he himself declares in the eighth and last edition (1851) of his "Steam

Engine Railways," that a steam voyage across the Atlantic was a "physical impossibility," the more so that he was, of course, well aware of the previous voyages of the Savannah and Curacao. What he did say, especially at the meeting of the British Association at Bristol in 1836, was that "the long sea voyages which were contemplated could not be maintained with that regularity and certainty which are indispensable to commercial success by any revenue which could be expected from traffic alone, and that without a Government subsidy of a considerable amount such lines of steamers, although they might be started, could not be permanently maintained."

The subsequent history of the Great Western, Sirius, Royal William, British Queen, and other steam vessels which immediately followed them, furnished ample justification of Dr. Lardner's views. With the exception of the Great Western, which was kept running at great loss, these vessels one by one were withdrawn, and drafted to other services, their retention on the Atlantic being commercially most undesirable. This was the state of matters when Mr. Samuel Cunard came over to this country from Halifax, Nova Scotia, fired with the resolve to form a company, and establish, on a firm and secure basis, a line of transatlantic steamships. Brought into contact with Mr. George Burns, of Glasgow, and Mr. David McIver, of Liverpool, each of whom, like Mr. Cunard, had been nursing the idea of such a service for some time: the celebrated Cunard Company, backed by a handsome Governmental subsidy for prospective mail services, was the result. Their first vessels were the paddle steamers Britannia, Acadia, Columbia, and Caledonia, all of about the same dimensions, i.e., 207ft. long, 34ft. 4in. broad, 22ft. deep, 1,154 tons burthen, and 740 horsepower. Their cargo capacity was about 230 tons, and there was accommodation for 115 cabin passengers. The Britannia inaugurated the mail service by sailing from Liverpool on Friday, the 4th July, 1840, and arriving safely at Halifax after a voyage of 12 days 10 hours. Her return passage was made in 10 days, and the mail service thus instituted was carried on by these four vessels between Liverpool, Halifax, and Boston, and *vice versa*, with great regularity. The average speed then attained was about 8 1/2 knots per hour, and in 1844, when two additional vessels were running, the speed was increased to 9 1/2 knots. Increased speed and improved passenger accommodation were now so much a desideratum, owing to the natural demands of the public and threatened competition, that in 1848 four new vessels were added, longer and more powerful, the average speed with which was increased to 10 1/2 knots per hour. In spite of much dissatisfaction on the part of the shareholders in the Great Western, and of others who were desirous of entering the trade, the practical monopoly granted to the Cunard Company by the Government was persisted in solely because the terms on which the service was conducted were more advantageous than any others offered, and the service was most efficiently performed. The first Cunard steamers, in fact, were proved to be superior in power and speed to any others similarly employed—a superiority which, it may at once be said,

they have all along maintained, though not without serious, if temporary emperilment through the enterprise of competitors.

To leave, meanwhile, the subject of the Cunard Company's progress and the commercial and other causes which enabled it to keep in the ascendant even amongst formidable competition, we may direct attention to one or two points of departure which mark prominent steps in the development of steamships. One such step—clearly the most noteworthy to which attention could be drawn—is the substitution of iron for wood in the construction of ships' hulls. This radical change was first initiated in barges and light craft built for canal and inland lake service, amongst others, by John Wilkinson, an iron-founder of Lancashire, so far back as 1787, Thomas Wilson on the Monkland Canal, Scotland, in 1818, and John Laird, founder of the celebrated firm of that name in Birkenhead in 1829. The first iron steamer was the Aaron Manby, built at Horsely Iron Works, Tipton, in 1820, and named after her designer and builder. The first iron steamer built on the Tyne was the Prince Albert, built at Walker in 1842; the first on the Wear was the Amity, built in 1853, and the first on the Clyde was the Aglaia, built in 1832 for service in Loch Eck, in Argyleshire. The distrust and opposition which this great change met with from the public, and even from a large section of ship-owners and builders, hindered its development for many years, and in spite of testimony to the safety, not to say suitability, of iron for construction, as evidenced in many actual vessels thus built, the prejudice lingered on. The building of the Great Britain during the years 1838-1844 was, therefore, a characteristically bold step on the part of Brunel and the company for whom he acted. This remarkable vessel, the marvel of her day, was in herself a striking exemplification, not only of the natural evolution of the steamship as regards dimensions, but of the revolution in construction and propulsion, destined before many years to completely supplant the wood hull and paddle-wheel propeller. She was over 320 feet in length, 51 feet beam, 32½ feet deep: her hull was constructed of iron, and she was fitted with a screw propeller, the application of which Brunel had already studied in the case of the Archimedes, tried in 1839, and the first practically successful screw-propelled steamer. The Great Britain left Liverpool on her first voyage across the Atlantic on August 26th, 1845, and arrived at New York on September 10th, after a voyage of 14 days 21 hours. The return voyage was made in 15½ days. After one more voyage she was fitted with a new screw, and alterations were made to give a better supply of steam. She made two more voyages during 1846; but on her third voyage from Liverpool she over-ran her reckoning and stranded in Dundrum Bay, on the north-east coast of Ireland. This unfortunate event completed the ruin of the Great Western Company, already sorely crippled in finance through the establishment of the subsidised Cunard Line. This misfortune, however, helped incalculably to develop shipbuilding in iron. The vessel, after lying aground in no very comfortable situation for about

11 months, was floated and sold to a Liverpool firm. On a general survey being made it was found that she had not suffered any alteration in form, nor was she at all strained. Many of the shipbuilders and shipowners, who had been hesitating about the judiciousness of employing iron, paid visits to the stranded vessel, inspected her after docking, and felt entirely convinced of the suitability of iron for ship construction. After necessary repairs, and being fitted with auxiliary engines of 500 horse power, the Great Britain was employed making regular voyages between Liverpool and Australia. Subsequently she was converted into a sailing ship, and only so recently as last year, as the result of having stranded on the Falkland Islands, she was badly injured, and sold to serve as a coal hulk there. So ends the career of what must be regarded as one of the most notable steamships ever built.

Ocean navigation by iron screw steamers was now placed on a thoroughly practical footing, and, although the transatlantic service continued to be conducted by wooden vessels propelled by paddle-wheels for some time longer, the superior efficiency of the screw for over-sea propulsion became more and more understood and accepted. The year 1850 forms a noteworthy landmark in the history of the steam service across the Atlantic and in the development of steam navigation in its wider aspects. In that year the celebrated Collins Line of steamships, backed by a substantial subsidy from the American Government, was established with the pronounced intention of eclipsing the Cunard Company; and the competing Inman Line also sprung into existence. The Collins Line ushered into the service four wood steamers of American design and build named the Arctic, Baltic, Atlantic, and Pacific. They exceeded in size and speed anything then afloat, and they seriously assailed for a time the high prestige of the Cunard vessels. Success, however, did not attend the vessels financially, and disaster after disaster soon hopelessly blighted the prospects of the Collins Line as a rival to the Cunard Company. The Inman Company boldly assailed the Cunard Company with vessels having features which placed all others at a disadvantage as regards economy, and which were destined to have a powerful influence on the future of the Atlantic steamships. These features were the iron hull and the screw propeller. Their first vessel was the City of Glasgow, built by Messrs. Tod and McGregor, on the Clyde, their second being the City of Manchester by the same builders. With these vessels, and others subsequently added, a fortnightly service was established between Liverpool and Philadelphia, and continued up to 1857, in which year and those immediately following a continuous enlargement of the company's operations took place. When the Cunard Company realised the formidable competition they were being met with, not only by the Collins Line but by the Inman Company, they made renewed and extraordinary exertions to retain their position. They sent forth the P.S. Arabia, of 2,400 tons and 938 horse power, in 1852, and in 1855 the P.S. Persia—the first iron vessel they owned, and the largest and swiftest of their fleet, was launched from the yard of Robert Napier and Sons, on the Clyde.

In a comparative statement of the voyages of the principal steamers engaged in the transatlantic trade, in 1856, including the Collins Line, the average speed of the Cunard vessels throughout the year exceeded that of all the others. The *Persia*, on four occasions during the year named, made the passage from New York to Liverpool in less than $9\frac{1}{2}$ days—in one instance, indeed, performing it in 9 days 4 hours and 35 minutes. Her outward passage between Queenstown and New York was made on an average in $10\frac{1}{2}$ days. In 1862, the Cunard Company placed the *P.S. Scotia* on the Atlantic; built like the *Persia*, of iron, but of greater dimensions and superior in speed and strength to that vessel. She measured 366 feet in length, $47\frac{1}{2}$ feet beam, $30\frac{1}{2}$ feet deep, her gross tonnage being 3,871. Her engines were of 975 nominal horse-power, but she indicated at sea as much as 4,200 horse-power. Her two cylinders were respectively 100 and 144 inches diameter, and her paddle wheels upwards of 40 feet diameter. Notwithstanding that this vessel was glowingly referred to at the time as "the champion and model of a mercantile ocean steamship," and that her early performances surpassed those of any previous vessel, she was destined to be the last of the paddle steamers built by the Cunard Company. In the same year which gave her birth the Government sanctioned the use of the screw in the mail steamers of the Cunard Company, and the screw steamer *China* was at once the result. This vessel was followed during the next two years by four others, the result of whose performances clearly demonstrated—if demonstration were needed—that the screw-steamer in point of efficiency and economy—especially with the improvement which had concurrently taken place in the marine engine—far surpassed the paddle steamer for deep sea traffic.

With the triumph of metallic construction and screw propulsion thus consummated, no further radical change has since taken place in steamships, but the agents supplying motive power have undergone many important modifications.

Development, in size and power, of course, proceeded more swiftly than ever, but the lines on which it moved were conventional, and more in sequence with what had gone before. Steam navigation itself grew and flourished amazingly, additional companies were formed, and new steamships produced with such rapidity, and for services having such widespread ramifications, that it would be quite futile to attempt a complete survey of the movement. A few noteworthy dates and suggestive particulars are all that can be given. The Allan Line—to follow up the Atlantic Service—established their regular mail service between Glasgow and North America and Canadian ports in 1856. The Anchor Line commenced regular service between Glasgow and New York in the same year. The National Steamship Company, formed by a number of Liverpool merchants and shipowners, was established in 1863, the first vessels dispatched to ply between Liverpool and New York being the screw steamers *Louisiana*, *Virginia*, and the *Pennsylvania*, of about 3,500 tons gross measurement—at that time the largest vessels afloat. The Guion Line of Transatlantic steamships was started in 1866. The first mercantile steamship company to

develop the trade of England with her Indian possessions by way of the Isthmus of Suez was the Peninsular Company, afterwards developed into the now celebrated Peninsular and Oriental Company. Their first services were inaugurated in 1837, and the company is thus at present in its jubilee year. The Pacific Steam Navigation Company was established in 1847, and it was in vessels built for this company in 1856 that the compound engine, destined to effect or pave the way for so marvellous an improvement in the agents of propulsion, received its first satisfactory credentials. The subsequent adoption of the surface condenser and the circular multitubular boiler enabled higher pressures of steam to be safely carried and economically produced and used. The extended employment of screw-steamers in the general cargo-carrying trade from 1864-68 fostered the demand for engines and boilers of the improved type, and by 1875 their employment was almost universal for ocean-going steamers. Without these great improvements in the agents of propulsion and others of lesser note, which need not here be mentioned, the marvellous development which the past decade and a half has witnessed in the size, power, and speed of Atlantic steamers would not have been possible. The later development may be briefly outlined. The year 1874 is memorable in this connexion, for in that year the *Britannic*, belonging to the White Star Line, which had been started in 1870, was launched by Harland and Wolff, of Belfast. The *Germanic* followed in 1875, and, with these two magnificent vessels, which are 457 ft. in length, 45 ft. 3 in. beam, and 34 ft. depth of hold, this company held first place in the matter of fast steamships for a considerable time. The *Britannic* during 1876 averaged 7 days 18 hours 26 minutes outward from Queenstown to New York, and 9 days 6 hours 44 minutes homewards, and has averaged for the last ten years 8 days 9 hours 36 minutes outwards, and 8 days 1 hour and 48 minutes homewards. The *City of Berlin*, of the Inman Line, also built in 1874, averaged 8 days 10 hours 56 minutes outwards, and 8 days 2 hours 37 minutes homewards, and for the nine years from 1875 to 1883 inclusive, averaged outwards 8 days 19 hours 56 minutes, and homewards 8 days 8 hours 34 minutes, or putting it into rounder figures, the *Britannic* had reduced the average passage between the two points to $8\frac{1}{2}$ days, and the *City of Berlin* to $8\frac{1}{2}$ days. In 1879, two formidable competitors were in the field in the *Arizona*, of the Guion Line, and the *Gallia*, of the Cunard Company. From these vessels performances it was soon evident that another important advance had been made in shortening the Atlantic passage. The *Arizona*'s fastest passage outwards, made in September, 1881, was 7 days 8 hours 32 minutes, and homewards, during same month, in 7 days 7 hours 48 minutes. A period of active rivalry in producing first-class steamships now ensued, the Cunard Company building the *Servia*, the Inman Company the *City of Rome*, and the Guion Company the *Alaska*, all of which were completed in 1881. After them came the *Oregon* for the Guion Line in 1883, the *Aurania* for the Cunard Company in the same year, the *America* for the

National Line in 1884, and the Umbria and Etruria for the Cunard Company in 1885. Since the completion of the two magnificent vessels last-named, there has been a cessation in the race for swift and powerful steamships, but the immediate future will see its resumption under still more interesting conditions, when the two very notable vessels recently ordered by the Inman and International Company are put into the water. The results of the period of competition above outlined, as regards speed attained, are well exemplified in the following list, which we take from the paper on Atlantic steamers read by Mr. William John, of Barrow, at Liverpool, last year. The vessels are set down in the order of their absolutely fastest passage out or home :—

	Gross Tons.	Days.	Hours.	Mins.
Etruria	7,100	6	5	31
Oregon	7,375	6	10	35
America	5,528	6	13	44
City of Rome	8,144	6	18	0
Alaska	6,586	6	18	37
Servia	7,212	6	23	55
Aurania	7,269	7	1	1

Viewed purely from the point of view of the sea voyager, the results above recorded are alike remarkable and gratifying, whilst considered in their technical and commercial aspects, they also call for admiration. It is questioned, however, whether in most cases the attainment of great speed has been accompanied with corresponding or proportionate advance in other matters with which vital progress is concerned. Commercially, it is of that utmost importance that increase of speed and power should be achieved with the least possible weight of machinery, water, and fuel to be carried, with the least possible expenditure of fuel, with safety and efficiency in working, with low wear and tear and cheapness of maintenance. In the above list of vessels for instance, the America—in whose design many of the considerations here enumerated received unusually careful attention—appears to advantage. While being eighth in point of size, she shows fourth in the matter of speed, and her performances are attained with marked economy in fuel. In many of the crack ships of the Atlantic, speed has often been attained at what appears an enormous sacrifice of fuel and the commercial considerations which are used to measure the efficiency of ordinary cargo carrying steamers, if applied to them, would find them wanting. This means of gauging their merits, however, is scarcely the fitting one, for owners of swift mail and passenger steamers realize from experience that the speed and comfort which length of keel and power of engine confer are worth more than the possible reduction of their coal bill. Influences, however, are presently at work which render the future line of development more direct and less beset by conflicting and equally imperative conditions. The estrangement of mail and passenger steamships from those designed to carry cargo only, is surely taking place, and perhaps it will not be very many years before ships of distinct types are traversing the Atlantic and other oceans, in which the differentiation between passenger and cargo carrying is as clear as obtains on land in our railway systems. It appears to us that in this lies the solution of

a swift, safe, and comfortable Atlantic passage, which is becoming more and more the desideratum of voyagers from both continents. Increased speed and efficiency through engine power distributed over two self-contained sets of engines and boilers and given out through two separate propellers: absolute safety from foundering, through collision, or otherwise, ensured by the minute sub-division of the hull: and increased immunity from sickness and discomfort through the internal space being almost wholly at the disposal of passengers: these are some of the immense advantages which would accrue from such a departure. One or two mail and passenger steamships designed in this spirit, and given the benefit of the best possible workmanship, would soon earn a character for security, speed, and comfort, and an enviable prestige such as would promote more frequent voyaging and incite emulation. The two projected steamers referred to as having been ordered by the Inman and International Company are understood to partake of some of these features. It is to be hoped this is true, and that when finished the public will know how to appreciate the enterprise.

The recent progress in marine engineering, exemplified in triple and quadruple expansion of steam, is another element, it need only be said, charged with the greatest consequence to ocean navigation. Great as was the development due to the introduction of the compound engine, the rate of advancement in the case of this latter change will be still more striking.

The diminution in coal consumption coincident with the increase of steam pressure and the acceleration in speed which has been attained in recent years measures the principal element of progress; but there are many directions in which scarcely less wonderful advances are manifest. We need scarcely do anything more than enumerate these, as they find ample illustration in the many beautiful exhibits bearing upon shipbuilding throughout the Exhibition. One of the most important of these, of course, is the evolution in size of steamships, and the many-sided progress this implies in the manufacture of the material which goes to make up the structure of the steamship and in the varied machines and appliances used in the work. The use of steel, which has been so rapidly extended since its introduction about ten years ago, is one of the most important factors in present day progress in ship construction. It enables plates of greatly increased dimensions to be used, thus economising the amount of riveting, it is far more reliable and much more easily manufactured by the workmen, and it has added immensely to the safety of vessels in the event of grounding or collision at sea. A kindred improvement consists in the substitution of cast steel for wrought or forged iron in many features of the steamship, including some of the most vital to her safety. We need only instance those of the crank and propeller shafting and the rudder and stern frame. Messrs. Jessop and Sons, of Sheffield, The Steel Company of Scotland, Messrs. Spencer and Sons, of Newburn Steel Works, the Darlington Forge Company, and other firms noted for manufacturers of this description, are the exhibitors of important samples which are

worthy the attention of the visitors to our exhibition.

Of the technical skill and scientific acumen involved in the production of such huge steamships as meets the eye of the visitor to the Exhibition in the shape of minutiæ counterparts of them in wood and brass, little need here be said. It is implied in the foregoing hurried survey of the ships employed in the most important maritime service in existence. Many of the vessels to which allusion has been made are represented in the Exhibition, as well as many others noteworthy from other standpoints than that from which we have specially treated this subject. In closing, we may direct attention to the immense and highly representative collection of ships' models organised and shown by Lloyd's Register. This embraces specimens from all quarters, of all the varied types of ships built, from the wooden sailing brig of date 1764 down to the Transatlantic "greyhound" and the crack yacht of to-day. Scarcely less interesting, and greatly more beautiful to look upon, is the splendid collection of models shown by our great local firms, Sir William Armstrong, Mitchell, and Company, and the Palmer Iron and Shipbuilding Company. Amongst these are many of the ships of war turned out by these firms—a branch of shipbuilding which, unfortunately, we have been compelled to overlook in the present article. It is while looking on these attractive objects, and considering all that they represent, that we are led to think of the aptness with which one of their own number has pictured the responsibility and the honour of the calling which ship-builders and engineers together follow. These are his eloquent words:—

If any body of men have just cause to feel pride in their calling, and in the fruits of their labour, ship-builders have. If we look at the magnitude of the operations of building, launching, engineering, and completing a modern passenger ship of the first rank, and regard the multiplicity of the arrangements and beauty of finish now expected, and then think this structure has to brave the elements, make regular passages, convey thousands of human souls, and tens of thousands of tons of merchandise every year across the ocean, in storm or calm, we cannot but feel that they are occupied in a useful human labour. But more than this, there is a public sentiment surrounding ships that no other mechanical structures can command. Beautiful churches, grand buildings, huge structures of all kinds have a certain interest pertaining to them, but it is different in kind from that which surrounds a ship. The former are fixed, immovable, inert; the ship is here to-day and gone to-morrow, building up a history from day to day with a reputation as sensitive as a woman's to calumny, and like her consequently often a bone of contention as well as an object of admiration.

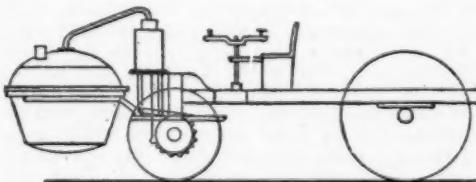


THE LOCOMOTIVE ENGINE.

[BY JOHN A. HASWELL, M.I.M.E., NEWCASTLE.]

Whilst we cannot fully endorse the proverbial saying that when the necessity for a great work is demonstrated the needful man steps forward and performs the task, yet when we consider how more than three-score years ago the increasing commercial activity of this country imperatively demanded a proportionately improved method of transit—a method which should combine the three-fold requisites of economy, greater speed, and commercial practicability, we cannot resist the conclusion that, in this instance at least, the proverb was verified to its fullest extent. The deficiency existed. George Stephenson arose, and by the construction of railways worked by locomotive engines, demonstrated the possibility of overcoming the difficulty successfully, and in a manner which has at the present time attained the proportions of the marvellous.

To our Gallic neighbours belongs the honour of having the first locomotive, one constructed in 1769 by Nicholas Joseph Cugnot, for use on common roads. This humble piece of mechanism, the forerunner of our modern "iron horse," was not by any means a brilliant success. On its first trial it made two or three little journeys at a speed of about two and a half miles an hour, loaded with four persons. On one of the trials, having overbalanced itself, it fell with a crash when turning a corner. After this misadventure, instead of being repaired and having another trial, Cugnot's engine was carefully locked up to keep it out of harm's way.



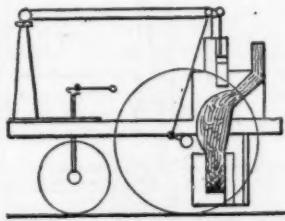
THE FIRST LOCOMOTIVE ON RECORD (1771).
Made and worked by a Frenchman, M. Cugnot. It is in the Conservatoire of Arts and Trade, Paris.

WATT AND MURDOCH.

Although this is the first authentic record of the locomotive, the suggestion of the practicability of the application of steam to locomotion on land had, according to Watt, been made by Robinson in 1759. Watt himself in 1784 patented a locomotive engine, which, however, was never executed.



Murdoch, his assistant, had, about the same time, built a model locomotive, which he was in the habit of showing to his friends in working order, drawing a small wagon round a room in his home at Redruth. Murdoch used to relate how, when experimenting with his engine, he determined to test its powers on a level road leading from his house to the church, which was distant about a mile from the town. This road was bounded on either side by high hedges, and admirably adapted to his purpose. He accordingly sallied forth, placed his engine on the ground, lit the fire, or rather the lamp, under the boiler. After a few minutes, off started the locomotive, with Murdoch in full chase. After a while, cries of distress fell upon his ear. The darkness prevented him from discerning distant objects, but on going on he found that the cries proceeded from the rector of the parish, who had set out for the town on business, and who, meeting the fiery monster on the lonely road, had imagined that it was the Evil One himself.



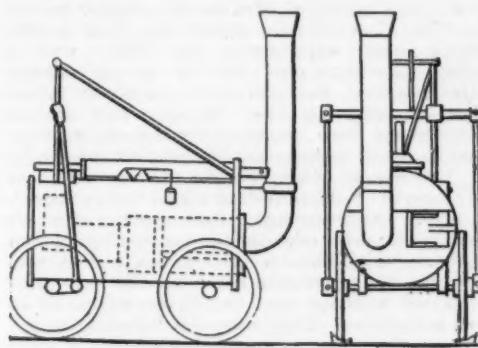
THE ENGINE OF WILLIAM MURDOCH (1784), WATT'S ASSISTANT.

A model engine which worked well. It is now at the Soho Works, Birmingham. Cylinder, 3in. diameter; stroke, 2ft. Diameter of front wheel 9in., back wheel 4in. This engine was at the Stephenson Centenary held in Newcastle June 9th, 1881, and was at work 100 years after its construction.

THE FIRST RAILWAY.

Eighty-four years have passed away since Parliament passed the first Act for the making of a railway. This was at Merthyr Tydyl, and in 1804 the trial of the first locomotive which ran upon a railway, and which was the joint production of Trevethick, a Cornishman, and Rees Jones, a Welshman, of Pen-y-darran, was described in a graphic manner. The trial was appointed to take place on a tramway then lately formed near Pen-y-darran, on February 12, 1804. Trevethick and his co-worker, Rees Jones, with black faces, but with eyes shining with the anticipation of victory, were on the engine. The signal was given, and, amidst approving cheers from the assembled multitude, the wheels turned, and Trevethick's engine moved steadily forward, going at the rate of five miles an hour. All was not plain sailing, however; the chimney stack of the engine, being built of bricks, when the locomotive reached a bridge a short distance from the town which was too low to admit of its going under, the chimney struck the bridge, fell with a

crash, and the engine came to a sudden standstill. So long as success seemed probable the crowd of spectators had been enthusiastic: now, however, they hung back and said, "It won't do." Trevethick and Jones, however, were of the same opinion as the great Napoleon, that impossible is a word only found in the dictionary of fools. They sprang to the ground, and, working like Britons, repaired the damage, started the engine once more, and reached the journey's end. The return journey was a failure, on account of gradients and curves, but the possibility of success was demonstrated, and from this run on the Merthyr tramway the railway age—marked with throes and suspense, delays, accidents, and misadventures—finally began.



TREVETHICK'S ENGINE (1802).

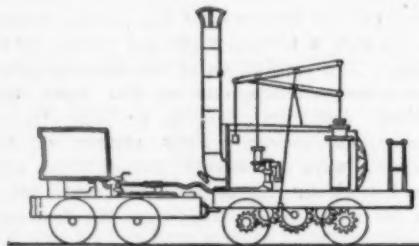
(A Trevethick Boiler is now at South Kensington.) Cast iron shell; wrought iron tube. 4ft. 7in. long, 3ft. 6in. diameter.

THE FIRST COAL LINE.

Seven years after this, in 1811, a patent was obtained by Mr. John Blenkinsop, colliery viewer, of Middleton, near Leeds, for mechanical means for the conveyance of coals and other articles. This patent consisted of the application of a rack or toothed rail laid down on one side of the roadway. Into this rack a toothed wheel was worked by the engine. The revolutions of this wheel produced the necessary motion, and at the same time rendered less the liability to slip in descending an incline. Four engines of this description were constructed, two of which commenced work in August 1812, and continued to work for many years. They were the first commercially successful engines employed on any railway. The names given to three of these engines are eminently suggestive of the great historical epoch in which they were built. They were The Salamanca, the Lord Wellington, and the Marquis Wellington, the other was named the Prince Regent. The Grand Duke Nicholas of Russia, afterwards the Emperor Nicholas, went twice from Leeds to Middleton and back on one of these engines in 1816. An engine similar in construction to these was at work at Coxlodge Colliery in 1815.

THE WYLAN EXPERIMENTS.

The first colliery owner in the North of England who practically identified himself with the locomotive was Mr. Blackett, of Wylam, who had one direct from Trevethick to work his waggonway about 1811. This engine, for some reason, possibly the imperfect construction of the waggonway, was never brought into use, and another, after Trevethick's patent, was made by Thomas Waters, of Gateshead, for Mr. Blackett in 1812. When completed, it was taken to Wylam on a waggon, and there mounted upon a wooden frame, with four pairs of wheels. But it would not move an inch. A gentleman, who was present at its trial, says:—"When the machinery was set in motion she blew all to pieces, and it was the biggest wonder in the world that we were not all blown up." Here ended the career of this second engine, so far as Mr. Blackett was concerned. This gentleman's next experiment, in 1813, was a most important one, for by it he effectually dissipated the previously prevailing fallacy that rack-rails, toothed wheels, and similar contrivances were necessary for the efficient traction of loaded wagons, and showed that the weight of the engine itself would produce sufficient adhesion to enable it to draw a load upon a smooth railway. The patent under the protection of which he carried out the experiments was obtained by him in the name of William Hedley, his viewer, who designed and constructed three locomotives, which remained working upon the Wylam waggonway up to a late period. They were the "Puffing Billy," now at Craghead, the residence of Mr. William Hedley, son of the inventor; the "Old Duchess," sent to the Patent Office Museum, South Kensington, June 6th, 1862, where it is shown as "the oldest engine in existence"; and the "Lady Mary," which was repaired and set to work again some twenty-five years ago. Subsequently, "Lady Mary" was sold for old iron, and sent to the scrap heap. One of the old Wylam drivers used to remark concerning this early product of northern engineering genius that it was "blood to the heels."



HEDLEY'S "PUFFING BILLY" (1813), WYLAN COLLIERY.

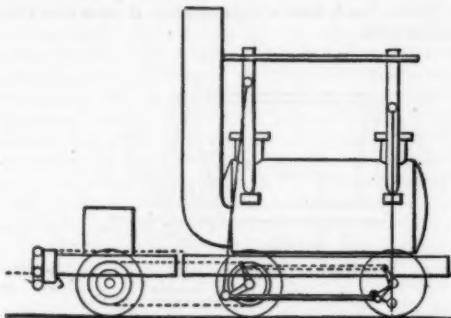
Now in the Patents Museum, South Kensington. Cylinders, 10in. diameter, stroke 24in. Tank wagon wheels 3ft. 6in. diameter.

Although these engines were fairly successful, the credit of launching the most successful locomotive that had yet been constructed must be conceded to George Stephenson, who, on July 25, 1814, placed the first engine of his own design and

construction on the Killingworth Colliery Railway. On that occasion it drew after it eight loaded wagons, weighing 80 tons, up a gradient of 1 in 450 at a speed of about four miles an hour. "Blucher," as this engine was popularly called, continued regularly and successfully at work for some time after this, and may now be seen on a pedestal at the Newcastle end of the High Level Bridge.

THE KILLINGWORTH ENGINE.

Progress in locomotive building continued to be but tardy. In 1822 there were, however, five of Stephenson's engines at work on the Hetton Coal Company's Railway, taking coals to the staiths on the Wear at Sunderland. As we have already said, progress had been but tardy; prejudice was powerful against the adoption of any other mode of transit than that which had been in vogue for centuries past, yet the triumph of steam was near at hand.

STEPHENSON'S ENGINE (1815), KILLINGWORTH COLLIERY
Boiler, 8ft. by 2ft. 10in. Cylinders, 8in. diameter, 24in. stroke.
Wheels, 5ft. diameter.

LOCOMOTION.

THE FIRST PASSENGER LINE.

The Stockton and Darlington Railway, the first iron railway ever laid down to the length of twenty-five miles, was opened on September 27, 1825, and the "Locomotion," the original No. 1, now on view in the Exhibition, and which was also exhibited working at the Railway Jubilee, on September 27, 1875, constructed by George Stephenson, was the first locomotive which ever ran upon a public railway. In 1830, the stock of engines on the Stockton and Darlington railway, had risen to thirteen most of them built by Stephenson.

HACKWORTH'S IMPROVEMENT.

The management of the locomotives, stationary engines, and horses was entrusted to Mr. Timothy Hackworth, a name which occupies a prominent position in the early evolution of the locomotive engine. Vicissitudes again overtook the locomotive, and the company had all but decided to abandon their use, when Hackworth proposed to construct one which should meet the requirements of the traffic. His offer was accepted, and in 1827 the "Royal George" commenced working. There is good reason to believe that this was the first locomotive boiler ever used on the Stockton and Darlington Railway with a return tube, all previous to this time having only straight tubes from

end to end. Hackworth thus nearly doubled the heating surface of his boiler, but he also did much more to increase its efficiency. At that time it was not generally known that by the breaking up or diversion of the course of a current of heated air or flame, it may be made to give up its heat much more rapidly than when the products of combustion pass in a straight line to the chimney. The return tube boiler was comparatively most efficient, and was, in its way, quite as great an advance on the direct tube as the boiler of the Rocket type was upon it. Locomotion by steam had previously been doubtfully practicable, by this improvement it was rendered certainly practicable. There is a point of local history, not generally known, attaching to this engine. At the time that Hackworth's offer was accepted Mr. Wilson was attempting to build an engine in his shop on the Forth Banks, Newcastle, on land which has since passed into the possession of the North-Eastern Railway Company. This boiler was purchased by the Stockton and Darlington Company, and served for Hackworth's engine. The general features of the design of this engine, and also the great advance in size and power between now and then, may be sufficiently gleaned from the following figures:—It had cylinders eleven inches in diameter, with a stroke of twenty inches. They were placed in a vertical position and worked direct upon a pair of wheels. The waste or exhaust steam was used partly to heat the feed-water and part of it escaped up the chimney, through a small conical pipe, to promote the draught. Although we are aware of the controversy waged at one time with regard to the invention of the blast-pipe, and have no wish to revive it, yet we think that the performance of the "Royal George" shows that it had some such contrivance for promoting the consumption of coal in the fire grate. This engine was capable of travelling nine miles an hour, drawing a gross load of 130 tons, and was of about twenty-eight horse power. Engine and tender weighed fifteen tons.

GEORGE STEPHENSON'S TRIUMPH.

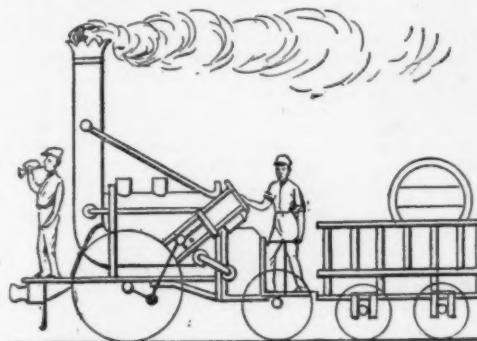
The next important stage in the progress of the locomotive engine was furnished in April, 1829, when the directors of the Manchester and Liverpool Railway (now a portion of the London and North-Western) offered a prize of £500 for the best locomotive engine which should conform to certain conditions and regulations. Four engines were entered for this historic competition—the "Rocket" by George Stephenson, the "Novelty" by Braithwaite and Ericsson,* the "Sanspareil" by Timothy Hackworth, and the "Perseverance" by Burstall. The trials were fixed to take place on October 1st, 1829, at Rainhill, on a level stretch of railway about two miles in length. They did not, however, commence until a week after this date, and lasted until the 14th of the same month, when the prize was awarded to the "Rocket."

THE ROCKET.

Well nigh sixty years have passed away since these experiments—perhaps more important in

* Ericsson designed the Monitor type of ironclads and the celebrated torpedo Peacemaker.

their influence on human progress than any others ever made—took place. The opening of the Liverpool and Manchester railway followed close upon this trial, taking place on September 15, 1830. A melancholy episode in connexion with the opening ceremony deserves to be recorded here, and which cast a gloom over an occasion which otherwise bade fair to be a brilliant success. The Duke of Wellington, Sir Robert Peel, Mr. Huskisson, and other distinguished gentlemen were in a carriage to which was attached the "Northumbrian" engine, which had stopped at Parkside, about 17 miles from Liverpool, for water, and was drawn up on one line of rails to admit of the "Rocket" and other engines passing in review before the Duke. Mr. Huskisson had alighted, and was standing on the opposite line, on which the "Rocket" was observed to be rapidly approaching. The spectators, realising the danger, called out to him, "Get in, get in." At the same instance the Duke made a sign of recognition to Mr. Huskisson, a slight coolness having previously existed, they clasped hands in a friendly grasp, for the last time, for as Mr. Huskisson, in his hurry and confusion, attempted to re-enter the carriage, he was knocked down by the "Rocket." When being raised up, he exclaimed, "I have met my death." His utterance was all too prophetic, for he died the same evening at Eccles parsonage from the injury he received. In him the railway system claimed its first victim. It is a remarkable fact in connexion with this lamentable occurrence that the "Northumbrian" engine driven by George Stephenson himself conveyed the injured gentleman a distance of fifteen miles in twenty-five minutes, or at a rate of thirty-six miles an hour.



STEPHENSON'S "ROCKET" (1829).

Now in the Patents Museum at South Kensington. Weight 4½ tons. Cylinders, 8in. diameter; stroke, 16½in. Boiler, 8ft. by 3ft. Large wheel 4ft. 8½in. diameter.

THE ROCKET NOT THE FIRST LOCOMOTIVE.

It is a common error, and yet firmly fixed in many minds, that the "Rocket" was the first locomotive. It has no claim to be regarded as such, because for years before the Rainhill trials of 1829, or before the opening of the Liverpool and Manchester Railway, the Stockton and Darlington line had been regularly worked with locomotive engines; yet the "Rocket" was the first engine which com-

bined in itself all the essential features of the modern locomotive, and in many respects was entirely different from any engine then working on a railway. It had a tubular boiler and a fire box somewhat resembling the modern fire box. It had a single pair of driving wheels, and was mounted on springs, and it is probable that when at the Rainhill trials, it ran a little over 29 miles per hour. The proof which was thus supplied by the Rainhill trials that speeds might be attained which as yet had been scarcely dreamt of, revolutionised the entire aspect of the transit question. They opened up possibilities of the most astounding kind. "If a necromancer had suddenly appeared at Rainhill with a flying carpet, seated on which he could transport himself and his friends a hundred miles in the twinkling of an eye, the crowd could not have been more astonished than were those present when they saw the 'Rocket' careering over the course at a speed which left fast horses at full gallop behind. No one had ever before moved over the earth faster than a horse could carry him."

THE VALUE OF STEAM LOCOMOTION.

In bringing this part of our subject to a close, we cannot do better than quote some words of Lord Hartington, who when addressing a meeting at Chesterfield, some years ago, said, with reference to the immense benefits conferred upon the public by the extension of the railway system, that

Almost all the progress which this country has made in the last half-century is mainly due to the development of the railway system—all other vast developments of the power of steam, all the developments of manufacturing and mining industry would have availed but little for the greatness and prosperity of this country—in fact they could hardly have existed at all, if there had been wanting these internal communications which have been furnished by the locomotive engine to railways.

The changes which have been wrought in the history of our country by the invention of the locomotive engine are something that we may call astounding. There are some things which exceed the dreams of poetry and romance. We are justly proud of our imperial possessions, but the simple steam engine—especially the locomotive steam engine—has not only increased the number of the Queen's subjects by millions, but has added more to her Majesty's revenues than have been produced by any tax ever invented by any statesman. Comfort and happiness, prosperity and plenty, have been secured to every one of her Majesty's subjects by this invention, in far greater abundance than has ever been produced by any law, the production of the wisest and most patriotic Parliament.

We cordially endorse every sentence in this speech of the noble Marquis.

A MAN OF MUCH FAITH.

George Stephenson's faith in the magnificent future in store for the locomotive was unbounded, so also was his belief in the superiority of his own engines over all others. When it was proposed to give a trial on the Manchester and Leeds Line to those of another maker, he replied: "Very well; I have no objection; but put them to this fair test. Hang one of them on to one of mine, back to back. Then let them go at it; and whichever walks away with the other, *that's the engine.*"

MEN OF LITTLE FAITH.

Before closing our remarks on the gradual progress of improvements in what may be termed

"ancient" locomotives, we think that the following extract from the report of the directors of the Newcastle and Carlisle Railway under date December 3rd, 1825, may prove of interest:—

The directors deem it an advantage of great importance that an open line of way has been obtained exempt from incline planes, and easy of performance by animal power, whereby the carrier, relying on his own resources, is independent of auxiliary power, and its delays and risks, and the property under his charge is always secure from danger, sacrificing the interests of the public, to give up the idea of using locomotive engines, to which many of the landowners would very reasonably object; they propose permanently to secure the landowners against the adoption of such a power, by an express prohibition clause in the Act, though to persons conversant with the subject it must be obvious that the principle upon which the whole line is laid down must for ever preclude the introduction of these machines.

(Signed) JAMES LOSH, Chairman.

We shall refrain from making any comment upon this, to us, most remarkable statement; but will note the fact that on March 9th, 1835, only ten years after the date of the extract which we have reproduced above, a locomotive engine called the "Comet," which was built by Messrs. R. and W. Hawthorn, took one of the first trains which ran on the Newcastle and Carlisle Railway, the special prohibition clause having evidently been effectually disposed of.

OBJECTORS AND CROAKERS.

We have now passed in review the struggles of the locomotive from Cugnot's crude mechanism, in 1769, to the opening of the Newcastle and Carlisle Railway in 1835, and we see that for almost seventy years the clear-headed mechanical engineers of this country had been working out, in spite of all opposition, the great problem of the adaptation of the steam engine to railway locomotion. The character of the opinion which was entertained of their schemes at the period of their inception may be learned by a perusal of the following extracts from the *Quarterly Review* in 1825, in which periodical the introduction of locomotive traction is condemned in the most emphatic terms:—

As to those persons who speculate on making railways general throughout the kingdom, and superseding every other mode of conveyance by land and water, we deem them and their visionary schemes unworthy of notice.

The gross exaggeration of the locomotive steam engine may delude for a time, but must end in the mortification of all concerned.

It is certainly some consolation to those who are to be whirled at the rate of 18 or 20 miles an hour, by means of a high-pressure engine, to be told that they are in no danger of being sea-sick while on shore; that they are not to be scalded to death or drowned by the bursting of a boiler; and that they need not mind being shot by the shattered fragments, or dashed to pieces by the flying off or breaking of a wheel. But, with all these assurances, we would as soon expect the people of Woolwich to suffer themselves to be fired off from one of Congreve's *ricochet* rockets as trust themselves to the mercy of such a machine going at such a rate.

PERSEVERANCE.

Strange and ludicrous as these words seem to us at the present time, they accurately reflected the opinion generally prevailing when they were written; nevertheless, undaunted by such croakings, the resolute will and prescient vision persevered until such success has been attained as has revolutionised the civilised world. If we go back to 1848, we find that on the London and Birmingham

Railway the number of trains entering and leaving Euston Station was forty-four per day ; the average weight of the engines eighteen tons, and the gross loads were, for passenger trains seventy-six tons, and for goods trains one hundred and sixty tons. Now the weight of an express engine and tender is about sixty-five tons, and gross loads of from 250 to 300 tons are usual on passenger trains, and as far as 500 tons on a mineral train.

PROGRESS.

Not only has the weight of trains been considerably increased during the last half century, but also the speed, and therefore the duty of the engine has been greatly enhanced. A glance over the pages of "Bradshaw's Guide" will show that the average speed of passenger trains on six of the leading railways in the country was 37 miles per hour thirty-five years ago ; now it is about 48 miles an hour on seven of our railways. This great increase of speed is due to the fact that the locomotive engineers on our various railways have designed numerous types of engines, of increased weight, increased speed, and increased duty. In considering the various designs, we shall in the first instance direct our attention briefly to the type of engine required to work express passenger traffic, and here we find that the premier position is occupied by the Great Western Railway.

GREAT WESTERN ENGINES.

The engines of this company are of the description known as "single" engines ; that is, they have single driving wheels. These, however, are 8 feet in diameter, and of 7 feet gauge. The cylinders are placed inside, are of 18 inches diameter, and have a stroke of 24 inches. The total heating surface is 1,953 square feet ; the boiler pressure is 140lbs. per square inch ; and the tractive power per pound of steam pressure in the cylinders is 81lbs. The locomotives attain a speed of sixty miles per hour, and when in steam weigh sixty tons.

LONDON AND NORTH-WESTERN ENGINES.

About half-a-dozen years ago the weight of the heavier express trains on the London and North-Western Railway had increased so much that it became necessary to design a new standard type of engine for this service, having inside cylinders 17 inches in diameter and 24 inches stroke ; the driving and trailing wheels are coupled, and are 6ft. 6in. in diameter. The total heating surface is 1,102 square feet. Mr. Webb, the locomotive superintendent of the London and North-Western Railway, has made a bold innovation on existing practice by the introduction of compound locomotives, the design and construction of which we shall describe further on.

GREAT NORTHERN ENGINES.

Mr. Stirling, of the Great Northern Railway, holds a strong opinion that "single" engines are more economical than "coupled," not only in running, but also in repairs, and has designed his well-known, magnificent class of express engines in accordance with this conviction. They have single driving wheels of a diameter of 8 feet, and have a four-wheeled bogie in front, and trailing wheels 4 feet in diameter behind. The total heating surface is 1,165 square feet. The pressure of steam is

140lbs. per square inch, whilst the tractive power per pound of pressure in the cylinders is 95lbs.

LONDON AND BRIGHTON ENGINES.

On the London, Brighton, and South Coast Railway two types of modern express passenger engines are in use. The first is a single engine, with driving wheels 6ft. 6in. in diameter, and leading and trailing wheels of 4ft. 6in. in diameter. The engines known as the "Gladstone" type have inside cylinders 18½ inches in diameter, and with a stroke of 26 inches, and have coupled wheels 6ft. 6in. in diameter, under the barrel of the boiler ; the trailing wheels are 4ft. 6in. in diameter. The total heating surface of these engines amounts to 1,485 square feet, and their weight is 38 tons 14 cwt.

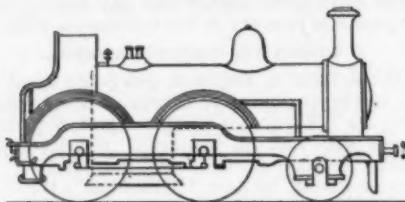
Mr. Stroudley, the locomotive superintendent of the London and Brighton, considers—contrary to the opinion which was once held, almost universally held—that engines having a high centre of gravity are the safest in traversing curves at high rates of speed, and for this reason, that the centrifugal force throws the greatest weight on the outer wheels and prevents their mounting ; and that there is no objection to these wheels being of a much greater diameter than that usually adopted.

MIDLAND ENGINES.

The standard express passenger locomotive of the Midland Railway Company has inside cylinders 18in. in diameter and 26in. stroke. The coupled wheels are 6ft. 9in. in diameter, whilst the leading wheels have a diameter of 4ft. 3in. The total heating surface of these engines is 1,206 square feet, and their weight 38 tons 8 cwt. This company have also recently introduced a very fine type of bogie engine, which have coupled driving and trailing wheels 7 feet in diameter.

NORTH-EASTERN ENGINES.

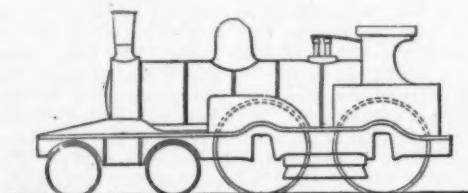
Having now dealt with each of the great English railways except the North-Eastern, we turn to it and the locomotives employed in working the express passenger traffic between York and Edinburgh. These are of two types, the first having cylinders 17½in. and 17in. diameter, with a stroke of 24 inches. The driving and trailing wheels are coupled, and are seven feet in diameter, whilst the leading wheels are 4ft. 6in. in diameter. The heating surface amounts to 1,182 square feet, and the total weight of the engine in steam is forty tons. These engines commenced running in 1872, they have thus been in active work for fifteen years, and during that period have performed their work in a highly satisfactory manner, both with respect to economy in consumption of fuel, in repairs, and also in the all-important point of keeping excellent time. The other type is a compound engine on the Worsdell and Von Borries system, designed and constructed by the former gentleman. They have two cylinders, the high pressure 18in. in diameter, and the low pressure 26in. in diameter, with a stroke of 24in. The driving and trailing wheels are 6ft. 6in. in diameter, whilst the leading wheels are 4ft. 7½in. in diameter. These engines possess a heating surface of 1,323 square feet, and their total weight is 43 tons.



NORTH-EASTERN RAILWAY. EXPRESS PASSENGER ENGINE (1885).
Cylinders, 18in. diameter; stroke, 24in. Centre wheel, 7ft. diameter.
Total weight under steam, 42 tons 8 cwt.

ROBERT STEPHENSON AND CO.

As befits the oldest firm of locomotive engineers in the kingdom, Messrs. R. Stephenson and Co. are here represented. They have forwarded for exhibition a very fine specimen of locomotive mechanism, which, although it may not appear so bold in outline as the engine sent by the Great Northern Railway Company, is, nevertheless, second to none in the Exhibition in point of excellence of workmanship and finish. It is a four-wheel coupled bogie express passenger engine, with tender, and is built from the design of Mr. W. Adams, locomotive engineer of the London and South-Western Railway, and is one of a type which is employed to work the fast West of England passenger trains between London and Exeter, and is capable of taking an average load of 150 tons, exclusive of passengers and luggage, at a speed of 45 miles per hour between the termini named. The engine has outside cylinders of a diameter of 18 inches, and a stroke of 24 inches. The driving and trailing wheels are 6ft. 7in. in diameter, whilst the leading end is carried upon an "Adams" bogie, having four wheels 3ft. 4in. in diameter. It possesses a heating surface of 1,158 square feet, the working pressure in the boiler amounts to 160lbs. per square inch, and the tractive force of the engine is 98·4lbs. for each pound of mean cylinder pressure. It is fitted with the Adams patent vortex blast pipe, by the employment of which it is claimed that a saving of 2lbs. of fuel per mile has been effected. This blast pipe is exhibited in close proximity to the engine. The engine is fitted with a combined automatic vacuum and steam brake. The tender, capable of containing 2,800 gallons of water and 3½ tons of coal, is upon six wheels of a diameter of 3ft. 9¾in. The weight of the engine in full working order is 46½ tons, whilst that of the tender with water and fuel is 31½ tons.



ENGINE BY MESSRS. R. STEPHENSON AND CO.
Now in Jubilee Exhibition, Newcastle. Front wheels, 3ft. 4in. diameter; back wheels, 6ft. 7in. diameter.

GOODS ENGINES.

Having thus noticed some of the chief types of passenger locomotives, we will now devote a small space to goods engines, in which class the rarity of type existing in passenger engines does not prevail, greater uniformity being observable. As a general rule, they have six wheels, all coupled, usually 5ft. in diameter; and have cylinders of 17in. and 18in. diameter, with a stroke of 24in. or 26in. Their total heating surface varies between 1,000 and 1,200 square feet, whilst their weight when ready for work averages 30 to 38 tons. Whilst these dimensions are, as we have said, usual, there are of course, exceptions to them, one of which is provided on the North-Eastern Railway in the type of engine employed to work the traffic on the Redheugh bank, and locally known as a "camel" engine. It is a tank engine, weighing 48½ tons, having six wheels 4ft. in diameter, all coupled; it has cylinders 18in. in diameter, and with a stroke of 24in. The boiler pressure is 160lbs per square inch, and the tractive force per pound of steam pressure in the cylinders is 162lbs.

MODERN ENGINES.

SINGLE ENGINES AND COMPOUND ENGINES.

Both passenger and goods types in modern locomotives have now been dealt with, and we will now pass on to a consideration and statement of some points of difference in design, and also some recently-affected improvements, although practically the locomotive engine of to-day is the same in principle as it was when it left the hands of the Stephensons over half a century ago. At the present time considerable diversity of opinion exists among engineers as to the relative merits of "single" and "coupled" engines, the passenger traffic on the Great Northern Railway being worked by engines of the former description at a higher rate of speed, and with equal punctuality, as the traffic on the London and North-Western Railway is worked by locomotives of the latter class; whilst we may note that the consumption of fuel in "single" engines is less than in "coupled," a circumstance owing, possibly, to their great cylinder power, by which the steam is worked at a high rate of expansion. If "single" engines can take the required load, they will do so more economically and more freely than "coupled" engines, consuming on an average two pounds of coal less per mile. The allegation is made that engines of this class are more liable to slip than coupled engines. For instance, a Great Northern engine, with 8ft. driving wheels, in running down an incline with twelve carriages attached, at a speed of sixty miles an hour, made 242 revolutions per mile instead of 210; whilst a Midland engine travelling at a speed of fifty miles an hour down an incline, with ten carriages attached, made forty-three extra revolutions per mile when the coupling rods were removed as against seventeen extra revolutions with coupling rods attached. Changes of opinion as to the height of the centre line of the boiler are also noticeable. Thirty-six years ago the height varied between 5ft. 3in. and 6ft. 3in.; in later times it has been raised to 7ft. and 7ft. 6in., it being now generally conceded that—given the desideratum of a good road—as great speed and

safety in travelling round curves are as compatible with a high pitched engine, as were formerly supposed to appertain in a peculiar degree to a low-pitched engine.

THE LINK MOTION.

Although the same in principle as fifty years ago, yet during that time the locomotive, in addition to having improved in a great degree in the essentials of speed and power, has also had some important attachments made to it, among which may be mentioned the "link motion," introduced in 1842. This motion, for working the slide valves, derives its action from the eccentric sheaves placed upon the driving axle, whilst Joy's valve motion, introduced about the year 1885, for effecting a like purpose, is driven by the action of the connecting rods. Coal superseded coke as fuel about 1854, and as a consequence greater economy has resulted; whilst the injector was introduced in 1859.

LOCOMOTIVE "CABS."

Among other improvements we may also notice the cabs of modern locomotives, which, strange as it may seem, were viewed by many drivers when first brought into use with anything but friendly feelings, as the grim remark of one old driver respecting the new arrangement for his greater comfort amply shows. "I felt as if I was in my coffin," said he.

THE MARCH OF IMPROVEMENT.

The advance of technical knowledge, resulting as it has, in improved workmanship, has also contributed in a great degree to the perfecting of the locomotive. If we calculate the power of the "Rocket," running at a speed of 29 or 30 miles an hour and the power of a passenger engine travelling at a speed of 60 miles an hour, we shall find that the "Rocket" was about 80 horse power, whilst the modern engine is about 2,000, an immense increase in power.

ONE LOCOMOTIVE EQUAL TO 700 HORSES.

It is a somewhat tedious calculation to ascertain the power of a locomotive, as the speed at which it is running on a line of railway has to be taken into account. Fairbairn, in his valuable book entitled, "Useful Information for Engineers," says:—

Let us calculate the duty performed, and the force applied to one of our largest class of locomotive engines travelling with a train at the rate of 45 miles per hour, and we shall find the power given out to exceed seven hundred horses, or as much as would be required to drive the machinery of some of our largest factories.

ANOTHER EQUAL TO 1,000 HORSES.

Some of the locomotive engines travelling on railways in this country with express passenger trains, exercise, by calculation, the power of nearly one thousand horses. During some brake trials which took place on the North-Eastern Railway, it was ascertained that the accumulated force of the train running at a speed of 60 miles per hour exceeded 30,000 tons raised one foot high in one minute. This force represents a little over 2,000 horse power. The uninitiated will doubtless be astonished at the power exerted by coal in our modern locomotives, when they are told that one-eighth of a pound of coal, with one pint of water, will, on an average, move one ton over one mile of railway.

SPEED.

The question of speed is an all important one. We have at the present time developed a mean speed of fifty miles per hour. English trade and commerce have grown and are growing; time is now, perhaps more emphatically than ever before, money. Will this growth of trade and commerce create a demand for a yet further augmented rate of speed? If such a demand arises how can it be met? It is not very probable that any appreciable advance upon our present rate of travelling can be effected with our railway as now laid down, with the existing narrow gauge, gradients and curves, and with locomotive engines as at present constructed.

THE QUESTION OF THE GAUGES.

From 650 to 700 effective horse power is required to take an average train of 200 tons at 50 miles an hour along a level line; if, however, instead of 50 miles an hour, a speed of 70 is needed, a completely different state of things obtains. If we take a train whose gross weight, including engine and tender, is 175 tons, the train resistance requires to be determined; to attain this we must recur to experiments made as far back as 1848 by Sir Daniel Gooch. The resistance of a Great Western train running at 75 miles per hour was forty-two pounds per ton; if we take forty pounds for seventy miles an hour we have a total resistance of 7,000 pounds on the level, equivalent to 1,400 horse-power, or about double the average duty of a modern express engine. A locomotive to attain this power would require a much larger area of heating surface than is at present usual, in fact about double. On our present gauge it seems well-nigh impossible to compass this result, were it to be desired, unless a most exceptional mode of construction in combination with wheels of smaller diameter were to be adopted. If we are to have high speed we must have great power, a consumption only attainable with an ample heating surface. For steady running this means a broad gauge. An engine to fulfil the requirements set forth above could be designed for work on a broad gauge railway, and there can be little doubt that a higher rate of speed than at present obtains could be compassed if instead of our 4ft. 8in. railways we had Brunel's magnificent gauge. To put the matter in a sentence, if we must have quicker travelling we must make the rail to suit the locomotive, not the locomotive to suit the rail.

RECAPITULATION.

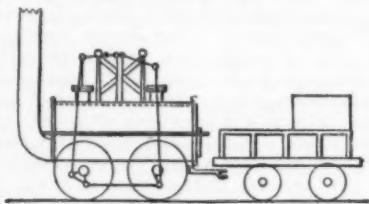
We have now traced the development of the locomotive engine from Cugnot's uncouth mechanism of one hundred and twenty years ago, and which was locked away to ensure that it did no harm to Murdoch's engine, which left the impression upon the mind of the quiet country parson that it was the Evil One himself, to the veritable No. 1, dragging its slow way from Darlington to Stockton, thence by rapid transition to the "Rocket," whose construction also marked an epoch in the history of the locomotive, to the present time, when it may be said that it has almost annihilated distance. The remainder of our article will be devoted to a description of those engines which have been grouped together within the North-

West Court of the Exhibition, and of these "Locomotion," the original No. 1 of the Stockton and Darlington Railway, possesses the first claim upon our attention, because it is the first locomotive which ran on the first public line of railway.

EXHIBITION ENGINES.

THE OLD ENGINE IN THE EXHIBITION.

It was supplied by George Stephenson, in 1825, to the Stockton and Darlington Railway Company, and took part in the opening of that line on the 27th September in that year, and its performances upon that memorable occasion realised to the fullest extent, aye ! even surpassed the sanguine expectations of the engineer and the directors. Attached is its diminutive tender, with an ordinary barrel as a tank for water. Behind this is one of the waggons used sixty years ago for the conveyance of coal. It is a noteworthy circumstance that at this early period all waggons used for carrying coal were registered by the Board of Trade to carry 53 cwt. of coal, and eight of such waggons was considered to contain one keel of coals. After "No. 1 Locomotion" ceased working, either by reason of old age or because it was superseded by a better class of engine, it was mounted on a pedestal in front of the North Road Station, Darlington, where it stood for many years. It was exhibited working on September 27, 1875, at Darlington, on the occasion of the Railway Jubilee, and it also occupied a position in the procession of engines at the Stephenson Centenary celebration in 1881. After this it was restored to its pedestal, only to be again removed, this time to journey across the Atlantic, where it was shown at the Chicago Exhibition ; it was also on view at Liverpool last year ; and now, in the sixty-second year of its existence, it is being exhibited in Newcastle for the second time. Well done, old Locomotion !



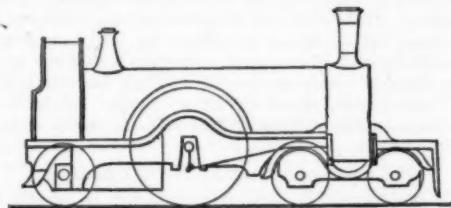
STEPHENSON'S "LOCOMOTION" (1825). The No. 1 of the Stockton and Darlington Railway.
Cylinders, 10in. diameter ; stroke, 24in. Weight, 6 tons 10 cwt.
Pressure, 25lbs per square inch. Weight, $\frac{1}{4}$ tons. Boiler, 10ft. by 4ft. Fuel, $\frac{1}{2}$ ton. Water, 240 gallons. Engine wheels, 4ft. Tender wheels, 2ft. 6in. diameter.

Now at the Jubilee Exhibition, Newcastle.

THE GREAT NORTHERN ENGINE.

Perhaps few things illustrate the truth of the poetic quotation that "the old order changeth, giving place to new," than the engine which is in juxtaposition to "Locomotion." We refer to No. 776 engine, which is exhibited by the Great Northern Railway Company, and which will doubtless attract general attention from its bold and noble outline, and we may fairly assume that it will be deemed by the general public to belong to the "upper ten" class of locomotive

engines. It was designed by Mr. P. Stirling, the mechanical engineer of that company, in 1869, since which time upwards of forty of the same class have been constructed to replace engines which were worn out. It is of the outside cylinder type ; these are 18in. in diameter and have a stroke of 28in. The engine is upon eight wheels, and the leading end is supported on a four-wheeled bogie, the wheels of which are 3ft. 11in. in diameter. The pair of "single" driving wheels are 8ft. 1 $\frac{1}{2}$ in. in diameter. The boiler has a total heating surface of 1,045 square feet, and is adapted to burn coal as a fuel. The tender is on six wheels of a diameter of 4ft. 1 $\frac{1}{2}$ in., and the tank is capable of containing 2,900 gallons of water. These engines were designed to take the heaviest and fastest express passenger trains, and have given great satisfaction. Their train load is usually 140 tons, exclusive of passengers and luggage, and they attain a speed of from fifty to fifty-two miles per hour. The weight of the engine in working order is forty-five tons, and of the tender, when filled with water and fuel, thirty-seven tons. The engine is fitted with the vacuum brake; this is so arranged that it is capable of working either simple or automatic. The steam pressure is 140lbs. per square inch, whilst the tractive power per pound of steam in the cylinders is 94lbs. As we have previously remarked when speaking of "single" engines, Mr. Stirling holds a strong opinion that "single" driving wheels as against coupled are more economical, not only in running but also in repairs.



GREAT NORTHERN RAILWAY EXPRESS PASSENGER ENGINE.

Boiler, 11ft. 5in. by 4ft. Cylinders, 16in. diameter ; stroke, 24in. Weight, 38 tons 9 cwt. Diameter of wheels, 4ft. 5in., 8ft. 1in., 3ft. 11in., and 3ft. 11in.

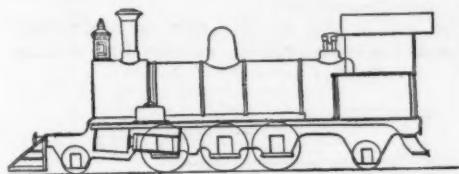
We will now turn to the exhibit furnished by the North-Eastern Railway Company. It is a compound passenger engine, No. 1,324. Before, however, we describe this engine we must understand the difference existing between a compound locomotive and an engine of the ordinary description, such as are at present in use. In the latter type the engine has two cylinders of the same diameter and length of stroke, working under a uniform pressure of steam. This class of engine discharges through the chimney into the atmosphere, at every revolution of the wheels, a given weight of steam at a given pressure. On the other hand, a compound locomotive may have two, three, or four cylinders. The engine exhibited by the North-Eastern Railway Company is designed on the Worsdell and Von Borries system, and has two cylinders, one a high pressure, 18in. in diameter, and one a low pressure, 26in. in diameter ; these are placed on an incline of

1 in 60, and they have a stroke of 24in. The slide valves are worked by Joy's motion. The steam from the boiler, at full pressure, enters the smaller cylinder, and upon the completion of its work there it exhausts into the larger cylinder, does more work there, and then is exhausted into the atmosphere. It is maintained by the advocates of this compound system that the weight of the exhaust steam and its pressure is less than that of the ordinary engine, and therefore a larger amount of work is got out of it; hence a saving of fuel is the result. And to this it should be said that it is always considered a marked success in mechanics where a larger amount of work is got out of the initial power applied than previously obtained in similar machinery. The North-Eastern compound engine has four coupled wheels 6ft. 6in. in diameter, the leading wheels being 4ft. 6in. in diameter. The wheels are cast steel, and are worthy of close inspection by the visitor, because they are of first-class workmanship. Its total heating surface is 1,323 square feet, and the total weight when in working order 43·6·3 tons. The steam pressure is 170lbs. to the square inch, and the tractive power per pound of steam in the cylinders is 100lbs.

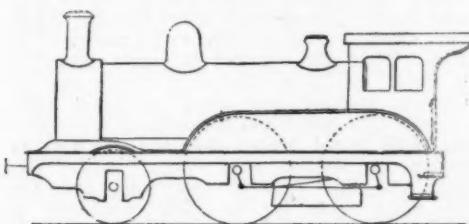
This engine is a splendid specimen of the locomotive, and its workmanship does credit alike to the builder and designer, and to any expert it displays marked evidence that the designer is well versed with the autonomy and physiology of a locomotive. We understand that Mr. T. W. Worsdell, mechanical engineer for the North-Eastern Railway, is having several engines of this class, except that they will have bogies in front, constructed in the Gateshead works, for working the express passenger traffic between York and Edinburgh, which are intended to perform the journey between the latter city and Newcastle without stopping.

pressure attached to the trailing wheels, and one inside low pressure attached to the middle wheels; thus practically there are two separate engines working independent of each other. But this separate action, it appears, produces an irregular speed in the trains, especially on starting. On the Great Western and North British Railways compound locomotives having four cylinders, two high pressure and two low pressure, high and low pressure being in line with each other, are in use.

The next engine coming under our notice is that supplied by Messrs. R. and W. Hawthorn, Leslie, and Co., for one of our Australian colonies. In



connexion with this engine, we may remark that it has been evident for years past that the construction of locomotives for railways in Europe, but more especially in England, has changed hands. The leading railway companies build nearly all the engines they require in their own works, and seldom order any from private firms. As a consequence, these firms are compelled to look for orders abroad. The engine under notice, as we have said, is for Australia, and is constructed to meet the rather peculiar requirements of the colony for which it is intended. The line—of 3ft. 6in. gauge—upon which it will work is of what may be termed the "exploring" type, being built through an almost virgin country, and has consequently to be laid down as rapidly and economically as possible, consistent with substantial work. The engine has outside cylinders 14in. in diameter, and with a stroke of 20in. It has six coupled wheels and leading and trailing wheels fitted with "Hall" cranks and radial axles. The coupled wheels are 3ft. 6in. in diameter, and the radial wheels 2ft. 1in. The employment of "Hall" cranks and outside frames permits of a large fire box, which, in the case of this engine, is necessary, as the fuel employed is wood, the smoke box being fitted with wire gauze partitions to check and extinguish the sparks. The total heating surface is 748 square feet, the working pressure 160 tons per square inch; the tank is capable of carrying 1,200 gallons of water, and the tender will hold three tons of wood, whilst the total weight of the engine in working order is 27½ tons. It is capable of taking a load of 200 tons up an incline of 1 in 60 at a speed of 15 miles per hour, and of travelling round curves of a radius of 4 chains. Steel is the principal material used in the construction both of engine and tender. There are several noteworthy features on this engine, it being fitted with a cow-catcher and cattle alarm, and the head lamp is lighted by electricity, and is capable of illuminating the darkness for a quarter of a mile ahead with a light equal to 800 candles.



NORTH-EASTERN RAILWAY. Mr. T. W. WORSDELL'S COMPOUND EXPRESS ENGINE (1886).

Cylinders, 18in. and 26in. diameter, and 24in. stroke. Boiler, 10ft. 7in. by 4ft. 6in. Front wheels, 4ft. 7in. diameter; back wheels, 6ft. 8in. diameter. 1,323·3 square feet of heating surface. Weight in working order, 53 tons 19 cwt.

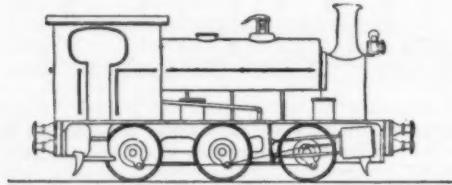
There are eleven engines of this class working passenger trains on the Great Eastern Railway between the metropolitan terminus of that company at Liverpool Street and Norwich, and it has been found that upon that railway, under the same conditions as to engine and train the compound passenger engines consume about fifteen per cent. less coal than does the ordinary type of non-compound engine on the same service. The compound engines of the London and North-Western Railway Company have three cylinders, two outside high

The electricity required to furnish this and other lights upon the engine is generated by a Parson's high speed motor of $2\frac{1}{2}$ electric horse-power, placed on the footplate of the engine, which is also provided with a steam brake on all its wheels. It is anticipated that this locomotive will be capable of attaining a speed of forty miles per hour. The name of the firm which has built it is a sufficient guarantee that the workmanship will be of a high class order.

MESSRS. BLACK, HAWTHORN AND CO.

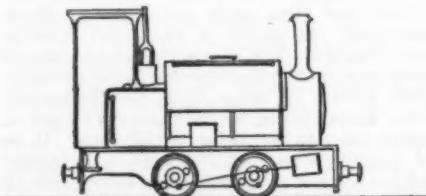
The well-known firm of Gateshead engineers, Messrs. Black, Hawthorn and Co., are well to the fore, exhibiting as they do no less than three engines, two being for use upon railways and the third upon tramways.

The first exhibit of this firm is a six-wheel coupled Tank Locomotive, suitable for working



branch, colliery, dock, or contractors' traffic. The cylinders are placed outside, are 14 inches in diameter, and have a stroke of 20 in. The working pressure in the boiler is 140 lbs. per square inch. The wheels of this engine are 3ft. 7in. in diameter, and its total wheel-base is 10ft. 9in. In order that the engine may work with greater facility when rounding sharp curves, the trailing wheels are fitted with Messrs. Black, Hawthorn, and Co.'s patent axle. The total heating surface of the boiler is 540 square feet. The tank, which is capable of containing 700 gallons of water, is placed over the boiler, whilst the coal bunker is situated behind, and contains one ton of coal. When in full working order, the engine will weigh 26 tons.

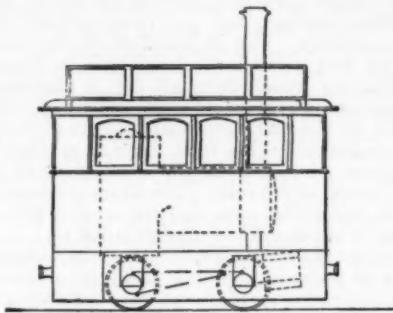
Next in order comes a small four-wheel coupled tank locomotive adapted for use on light railways



in general, or for shunting purposes at works, docks, or collieries. This is but a diminutive specimen of the locomotive engine, and has outside cylinders of a diameter of six inches, whilst the stroke of the pistons is ten inches. The heating

surface of the boiler is 102 square feet, and the pressure of steam in the boiler is 140lbs. per square inch. The wheels are but 2 feet in diameter, and the total wheel base is 3 feet 6 inches. As in the engine previously described, the tank is placed over the boiler, and is capable of holding 100 gallons of water, but instead of the coal bunker being at the end, as in the other engine, in this case they are along the sides, and can carry 3 cwt. of coal. The total weight in working order is $5\frac{1}{2}$ tons.

Messrs. Black and Hawthorn also exhibit a tramcar engine which possesses features not common to the



ordinary type of engine employed in working tramway traffic. It is a compound condensing tramway locomotive for use in towns, and complies with the regulations and requirements of the Board of Trade, and from our own personal knowledge we are prepared to state that it performs its work remarkably well, and with a reduced consumption of coal as compared with the general type of tramcar engines. As we have before remarked, it is a compound engine; the cylinders are of 8 inches and 14 inches diameter respectively, with a stroke of 12 inches. They are arranged in such a manner as the engine can be worked as a simple one for facility in starting and when ascending steep gradients. The boiler is of the ordinary locomotive form, with raised firebox case, and the working pressure is 160lbs. per square inch. The wheels are 2ft. 4in. in diameter, and the total wheel base is 5ft. The condenser is placed on the roof of the cab, and is formed of thin tubes one inch in diameter; these are arranged in sections, so that the exhaust steam entering one end of the condenser has to traverse each section before it can reach the other end; any steam uncondensed passes into the hot gases of the chimney, from which it escapes imperceptibly. The water from the condenser is received in a tank provided for the purpose. The cold water tank is placed between the frames behind the driving axle. The total weight of the engine in full working order is 10 tons, and it can be driven from either end, all handles being duplicated.

PROSPECTS OF FURTHER IMPROVEMENTS OF THE LOCOMOTIVE ENGINE.

After having traced the various developments of the locomotive engine, there now remains for a brief consideration the question of the prospects of

yet further improvements in its design, construction, and capacity. It is frequently asked : Is there any probability that an increased rate of speed and also an increase in the weight of train-loads on our railways will ever be attained ? Our answer to this question must partake rather of a conditional nature. Our railways, with the exception of the Great Western—and even on it only partially—are laid down on a comparatively narrow gauge, that is, a distance of 4ft. 8 $\frac{1}{2}$ in. separates the rails. This, of course, limits the distance at which the wheels can be set apart, between which the whole of the working machinery of the engine is to be placed, hence the diameter of the cylinders and the heating surface of the boiler and fire-box are limited.

For years past our locomotive engines have been constructed with cylinders of the largest diameter and heating surface of the greatest area that can be obtained. Such engines are capable of attaining an average maximum speed on ordinary gradients and during ordinary weather of from 50 to 55 miles an hour. To exceed this speed, under present circumstances, is a task difficult, though not, perhaps, impossible, of accomplishment. Increase of speed and power would probably involve the widening of the present gauge. This, we need hardly observe, is not within the range of coming events. On the other hand, the reduction of the expenditure for the working and maintenance of our present locomotives is probable, nay, it has even been accomplished, by the introduction of compound engines by Mr. F. W. Webb, Mr. T. W. Worsdell, and other locomotive engineers. The initial pressure of steam escaping through the blast-pipe of an ordinary engine is estimated to be from 60 to 80lbs. per square inch. In the compound engine this pressure has been reduced to about 40lbs. Again, if a more suitable description of fuel than is at present in use were to be employed, a still further reduction in expense would be effected. For instance, if liquid fuel in the shape of petroleum refuse could be employed instead of coal, there would be a considerable saving in consequence, or it may be that petroleum refuse mixed with English coal would produce a better fuel than is at present used. The superiority of petroleum refuse may be learned when we mention the fact that one pound of English coal will evaporate about eight pounds of water in a locomotive engine, whilst about 15 pounds of water will be evaporated by one pound of petroleum refuse.

In this direction then improvement should be looked for, and it may be that the enormous outflow of petroleum oil in the Caspian region and elsewhere will in the near future supply us with a practically limitless supply of liquid fuel for our locomotives, seeing that it has already been utilised as fuel in marine engines.

LIST OF EXHIBITIONS, FROM 1851.

[COMPILED BY PROFESSOR P. L. SIMMONDS.]

- 1851.—The World's Fair at Hyde Park.
- 1852.—National Exhibition at Cork.
- 1853.—Irish Industrial Exhibition, Dublin.
- “ New York International Exhibition.

- 1854.—Exhibition at Munich.
- “ Intercolonial Exhibition at Melbourne.
- 1855.—Paris International Exhibition.
- 1856.—Brussels International Exhibition.
- 1857.—Manchester Fine Arts Exhibition.
- “ Lausanne Exhibition.
- 1858.—Italian Exhibition at Turin.
- 1859.—Exhibition at Athens.
- “ Hanover Exhibition.
- 1861.—Art Treasures Exhibition, Edinburgh.
- “ Art Exhibition at Dublin.
- “ Exhibition at Melbourne.
- “ Amsterdam Fishery Exhibition.
- “ Italian Industrial Exhibition at Florence.
- 1862.—London International Exhibition, South Kensington.
- “ Wiesbaden Exhibition.
- 1863.—Exhibition at Constantinople.
- 1864.—Royal Dublin Society Exhibition, Fine Arts, and Irish Manufactures.
- “ An Exhibition of Native Arts, Manufactures, &c., at Freetown, Sierra Leone.
- 1865.—Dublin International Exhibition.
- “ Oporto International Exhibition.
- “ Stettin International Exhibition.
- “ Bergen Fisheries Exhibition.
- “ New Zealand International Exhibition, at Dunedin.
- “ Amsterdam Art Exhibition, International.
- “ Wakefield Industrial and Fine Arts.
- 1866.—Boulogne Fisheries Exhibition.
- “ Brazilian International Exhibition, at Rio Janeiro.
- “ Stockholm Industrial Exhibition, National.
- “ Rochelle (France) Fine Arts and Industry, National.
- 1867.—Arcachon Fishery Exhibition.
- “ Hague Fishery Exhibition.
- “ Paris International Exhibition.
- “ Agra Exhibition of Indian Products, Arts, and Manufactures.
- 1868.—Havre Maritime and Fisheries Exhibition, International.
- “ Leeds Art Exhibition.
- “ Roumanian Exhibition, at Bucharest.
- 1869.—Amsterdam Domestic Economy Exhibition, International.
- “ Altona Exhibition.
- “ Naples Maritime International Exhibition.
- “ Munich Art Exhibition.
- 1870.—Northampton Leather Trade Exhibition.
- “ Altona Exhibition.
- “ Workmen's Exhibition at the Agricultural Hall, London.
- “ Cassel Exhibition.
- “ Russian Industrial, at St. Petersburg.
- “ National Argentine Exhibition at Cordova.
- 1871 to 1874.—Annual Class International Exhibitions at South Kensington.
- 1872.—Moscow International Exhibition.
- “ Japanese Exhibition at Kioto.
- “ Dublin Exhibition of Industrial Arts and Manufactures.
- “ Lima Exhibition.
- 1873.—Cincinnati Industrial Fair.
- “ Vienna International Exhibition.
- “ Intercolonial Exhibition at Melbourne.
- “ Food Exhibition, Agricultural Hall, London.
- 1874.—National Exhibition of Arts and Industry, Brussels.
- “ National Exhibition of Arts, Industry, and Commerce, at Rome.
- 1875.—Paris Maritime Exhibition, International.
- “ Chilian International Exhibition at Santiago.
- 1876.—Loan Collection of Scientific Apparatus, South Kensington.
- “ Life Saving Exhibition at Brussels.
- “ International Exhibition, Philadelphia.
- 1877.—South African International Exhibition, Cape Town.
- “ Paris Electric Exhibition.

1878.—Great International Exhibition at Paris.
 1879.—Milan International Exhibition.
 Sydney International Exhibition.
 1880.—National Exhibition, Brussels.
 " Painting and Stationery, &c., Agricultural Hall, London.
 " Melbourne International Exhibition, 1880-1881.
 " Electric Lighting Exhibition, Alexandra Palace, London.
 1881.—Medical and Sanitary, South Kensington.
 " Wool Exhibition, Crystal Palace—International.
 " National Industrial Exhibition, Milan.
 " Smoke Abatement Exhibition, South Kensington.
 " Electric Appliances International Exhibition, Paris.
 " Adelaide International Exhibition.
 " New Zealand International Exhibition, Auckland.
 1882.—Newcastle Sanitary Exhibition.
 " Trieste Exhibition.
 " North-East Coast Exhibition of Naval Architecture, Tynemouth.
 " Electric Exhibition, Crystal Palace—International.
 " Lille International Exhibition of Industrial Art.
 " Naval Engineering, Agricultural Hall, London.
 " Queensland International Exhibition.
 " New Zealand Exhibition at Christchurch.
 1883.—Glasgow Sanitary Exhibition.
 " International Fisheries Exhibition, South Kensington.
 " Building Trade Exhibition, Agricultural Hall, London.
 " Furniture Exhibition, Agricultural Hall, London.
 " Sportsman Exhibition, Agricultural Hall, London.
 " Prague Electrical and Industrial Exhibition.
 " Calcutta International Exhibition.
 " Madrid Exhibition of Mining and Metallurgy.
 " Electric Exhibition at Vienna.
 " New Orleans International Exhibition.
 " Amsterdam International Exhibition.
 " Western Australian Exhibition.
 1884.—London Healtheries, International Exhibition.
 " International Fine Arts and Industrial Exhibition, Crystal Palace.
 " Marseilles Maritime Exhibition.
 " Exhibition at Turin.
 " Philadelphia Electric Exhibition.
 " Hungarian National Exhibition at Budapest.
 " Nice International Exhibition.
 " International Forestry Exhibition, Edinburgh.
 " Antwerp International Exhibition.
 1885.—Inventions Exhibition, South Kensington.
 " International Exhibition at Alexandra Palace.
 " Uruguay National Exhibition at Monte Video.
 " Mining Exhibition at Glasgow.
 1886.—Colonial and Indian Exhibition.
 " Folkestone Art Exhibition.
 " Liverpool International Exhibition.
 " Edinburgh International Exhibition of Industry, Science, and Arts.
 1887.—Liverpool Exhibition.
 " Newcastle Exhibition.
 " American Exhibition at London.
 " Barcelona International Exhibition.
 " Manchester Exhibition.
 " Adelaide International Exhibition.
 " Saltair Exhibition.
 " Havre Maritime International Exhibition.
 " Food and Cooking Exhibition at Amsterdam.
 " Railway Exhibition at Paris.

THE FINE ARTS SECTION.

[BY MR. J. E. HODGSON, R.A., PROFESSOR OF PAINTING AT THE ROYAL ACADEMY.]

It has been said, by a witty modern writer, that the best way to introduce a subject is to string together a number of common places and platitudes which shall call attention to the subjects, and have the effect of awakening attention without fatiguing the mind. Acting upon this as sound advice, I shall venture to observe that this country, this year, is celebrating what may be called the festival of retrospection. The ordinary occupation of civilised man is to enjoy the present and to make plans for the future; looking back upon the past is, by common consent, avoided, as a process not productive of unmixed satisfaction; so that it is perhaps a salutary thing for a nation, when circumstances compel it to take a backward glance, and to contrast its present position with that of fifty years ago; and the amount of self-complacency which it is able to derive in the process will be a fair measure of the progress gained. Industrial and material progress are easily estimated, but the case is different when we have to deal with art, a matter which depends so entirely on what Mr. Ruskin calls the theoretic faculty—on such an intangible and undefinable quality as that of taste. The collection of pictures in the Exhibition which is this day to be opened in this city, though not strictly representative in a jubilee sense of the fifty years of her Majesty's reign, enables one to form a very just estimate of the progress of the British school. That school, founded by Reynolds, Gainsborough, Hogarth, Wilson, and others, on a strictly eclectic basis, seems to have maintained its traditions intact down to the period of her Majesty's accession. At that time it had a singularly insular character, and was unlike any contemporaneous art. In the portrait painters, in Reynolds, Gainsborough, and Lawrence, we can trace some influence of the Venetian school, and a great deal more of that of the Netherlands—of Rubens, Van Dyk, and Rembrandt. In the painters of figure subjects of the class which the French have classified as *genre* painters—in Hogarth, Zoffany, Wilkie, and Mulready, for instance, Dutch influence is paramount, as it is also in landscape; Wilson, it is true, had drawn his inspiration from Claude and Gaspar Poussin; Turner, with his many-sided sympathies, had also at times turned his attention in that direction, and stooped even to imitate them; but the British school of landscape—Gainsborough, Crome, Cotman, Nasmyth, and Richardson—were artistically lineal descendants of Hobbema, Cuyp, and Ruisdael. They had the same love of simple themes and of common things, but with a characteristic difference, a greater tenderness, and a keener perception of beauty. So with the figure painters; they painted cottage interiors and scenes from peasant life, as the Dutchmen had done before them, and painted them, or, at all events, tried to paint them, very much as the Dutchmen had; but they idealised their themes,

and gave their figures an artless grace quite unknown to Teniers, Ostade, and Metzu.

Naturalism, as it was understood at the beginning of the century in this country, referred exclusively to the selection and treatment of subject, and the difference between it and high art lay in the sources from whence the artist derived his inspiration — conventionalism, very apparent and glaring to our eyes, ruled the efforts of both alike. In the nymphs and cupids of Reynolds, in the great scriptural canvases of Benjamin West, we can see no attempt to render any natural illumination or to represent anything as it really is. In Wilkie, Mulready and the landscape painters, pictorial effect was the only truth aimed at; light was focussed upon certain groups, and arbitrary shadows were thrown over others without any regard for the facts of nature. I will select as an example in support of this assertion the beautiful and also celebrated picture of "The Wolf and the Lamb," by Mulready. I had not seen this picture for many years, and it gave me great pleasure to study it again. Nothing can be more beautiful than its execution and colouring: it has all the finish and care of fine Dutch art, with a tender playfulness, if I may use such a term, which is thoroughly English. The timid victim shrinking against the palings terrified by the menaces of the young tyrant, whose clenched fists seem ready to "punch his head," is full of energy and humour. The incident is evidently inspired by observation of nature; but the midnight gloom which covers the landscape behind them, through which one can dimly discern the terrified mother rushing to the rescue of her ill-treated darling, is utterly conventional and false; it was necessary for the production of the sort of pictorial effect which Mulready understood, and which he and his contemporaries availed themselves of whenever it suited their convenience; but it had no foundation in nature. Fifty years have wrought a great change in our views; I don't think that we have improved upon Wilkie or Mulready, certainly not on Hogarth, in the delineation of passion, or in truth of expression; and before we boast of progress we must establish a definite standard of excellence; but we can no longer tolerate the solecisms in light and shade, the violence done to all sorts of atmospheric and meteorological laws, which our predecessors in art committed daily, because they knew no better. Art has, in fact, become more scientifically accurate than of yore, its merits can be more easily measured and explained, it appeals more to observation and perhaps less to sentiment. Much of this change has been brought about by different habits of study. The teaching of Ruskin and the influence of foreign schools have combined to make art a much more complicated matter than it used to be. Men go further afield in search of effects, and dive into far more recondite regions in quest of subjects; archaeology is ransacked and history turned upside down, all the lockers and secret drawers of human thought are routed out to furnish the annual show at Burlington House. Art reaches wider and appeals to a greater number of interests; and if it is less daring in its flights, it is certainly more conscientious. We have no Turners perhaps, but where in the wide world was there ever an Alma Tadema before; and

this city of Newcastle, in the person of Mr. Jobling, can boast of a marine painter who represents more accurate truth of sky and waves than can be found in the works of all the Dutchmen, or Cotman and Stanfield combined. Such being the case, we can fairly lay the flattering unction to our souls that art is progressing. The future is dim, we may not be able to discern whether it is tending; but in this jubilee year, during our festival of retrospection, that is not our business; so much have we achieved, let us accept it and be joyful. Messrs. Armstrong and Mitchell have made the biggest gun in the world, with a projectile larger than a portmanteau, and we owe them our deepest gratitude; it is not for us to speculate whether they are tending; what tremendous explosions may be in store for a guilty world in the cataclysms of the future is a subject we dare not enter upon, and can only piously ejaculate that sufficient unto the day is the artillery thereof; and so it is with art. After these prefatory remarks I will proceed to pass in review some of the most prominent pictures of the Exhibition.

English art of the eighteenth century is not very adequately represented in this Exhibition. The best Reynolds is a study of an old man's head, No. 719. It is easy to recognise the model who sat for his Ugolino in this careworn, unkempt, and unshaven head. Tradition has, I believe, preserved something of his history, but I have forgotten it. It was, I should say, a sad one; art has, like amber, the power to embalm and preserve trifles unnoticed by the busy world; and those who have hearts to sympathise with the sorrows of humanity may still feel a touch of pity and compassion for this nameless Englishman of the eighteenth century. There are one or two heads by Gainsborough, perhaps the greatest genius amongst English artists; they are exquisitely drawn, and full of life and intelligence, as are all his heads. No. 795, a child asleep, has all the qualities of the Reynolds school, though I find it difficult to assign its authorship. Tivoli and the River Scene are good examples of R. Wilson, especially the former. They are fine examples of landscape painting as it was understood in the days when the autocrat of Strawberry Hill could find no responsive touch in the narrow range of his sympathies for anything which did not hail from Italy. These pictures represent nature seen through the medium of a balmy, poetical, dream-inviting atmosphere; we may say that the medium is everything, the object nothing. The forms of objects, of trees, rocks, and mountains are inaccurate, and show no observation; the rock on the right of the river scene has some resemblance to a water-worn boulder, but the ruined castle on its summit compels us reluctantly to assume that it was intended for a cliff, and the darkened foreground of the Tivoli makes it impossible to surmise what hour of the day the picture is intended to represent. These are defects characteristic of the age; but the beauties are equally apparent. The exquisite translucency, the suavity of the atmosphere through which we discern the somewhat shapeless and abnormal masses of earthy matter, is a beauty which belongs to the infancy of landscape art, and which amongst its divers pre-occupations in our days appears quite lost sight of. Ad-

mitting the propriety of confining art to one single quality, those old men must be acknowledged to have chosen rightly. The true forms of nature, the method of her structure, require more careful study than the majority of men can find time to bestow upon it; and for one who can appreciate the subtle drawing and the extended acquaintance with natural phenomena which are shown by fine modern landscapes, there are a dozen who will at once perceive and acknowledge the truth of Wilson. English art of the 18th century was very wonderful; it was the product of men impressed before all things by a sense of sublimity, of brooding repose and awful majesty; they scorned the trivial, the glittering and the gay; with extraordinary self-restraint and resolution, they omitted every ornament, all accidental effects produced by cross lights or polished surfaces. Reynolds in his portraits, even when dealing with gold lace and jewels—objects over which many modern painters seem to forget themselves in a sort of pictorial ecstasy—never lost sight of unity and simplicity. The calm face, the flash of the eye, the intelligent curve of lip—these were his picture; all other things received only such partial recognition as their comparative insignificance deserved. One exception to this rule is, however, to be found in the case of Zoffany. I confess to a great weakness for this master; but I suspect that the pleasure he gives me is too purely technical to be general. He is chiefly celebrated for theatrical portraits, and the picture of the Gallery of Florence lent by her Majesty shows his talent under a new aspect. It seems to represent the collection of the Palazzo Pitti when it was in the hands of a hanging committee, and the fate of Titian's immortal Venus seems still to hang trembling in the balance. We can, however, augur from the expression of the evidently influential personage in a black satin suit, that it will not be skyed. Subjects of this sort were often treated by Dutch painters; and Rubens on more than one occasion, introduced a figure for some artist friend whose genius did not soar beyond the delineation of picture frames and tapestry. In Zoffany, however, the triviality is redeemed, if such a thing can ever be redeemed, by exquisite manipulation. The black satin suit, already alluded to, is a masterpiece of crisp incisive painting: heads, hands, draperies, bag wigs and lace ruffles, gilded frames and sculptured marbles, all the redundant details of the picture are touched in with the utmost mastery. It is a parade of means, and is painted, as far as can be discerned, with no more serious motive. Everything seems to be equally important and prominent. There is no attempt at mystery, or that generalisation of details which our modern French school has elevated into a vital principle, and pushed to the excess of a vice. Zoffany seems to pose for a straightforward man, who calls a picture frame a picture frame without circumlocution or ambiguity. He occupies the opposite pole to Reynolds and Gainsborough, the spiritualists of their day; his pictures will be prized as long as good work is held in reverence, but they will never appeal to the heart, never exercise that indescribable fascination, that spell which masters us before the portraits of Kitty Fisher and Mrs. Sheridan. The prophetic

mantle which fell from their shoulders, if it was ever worn again, was worn by Sir T. Lawrence. I have read somewhere that he was spoilt as a colourist by an excess of chalk drawing in his youth. Excessive chalk drawing is, perhaps, ruining a generation of colourists at the present moment, and grave doubts must suggest themselves to all professors of academies in England and abroad when they read the written testimony of such an authority as Peter Paul Rubens. Be that as it may, Lawrence approached within very measurable distance of being a great colourist, and before such a canvas as Master Lambton one is tempted to quote the popular saying that it was "as near as makes no matter;" indeed, I may say that here at Newcastle he is seen at his very best. If one could think only of such pictures as Curran, Lord Durham, and the one above quoted, and erase from the mind the disagreeable crudities he has seen at Windsor and elsewhere, he might be tempted to place Lawrence almost on a level with his great predecessors. A contemporary of Lawrence was Old Crome, of Norwich, who, with Cotman, founded a provincial school in that city of the marsh. Of the former, the exhibition has one very splendid example, No. 732, Paringland Oaks. The influence of his favourite Hobbema is traceable in every line. Taking colouring as an abstract quality and nature as a pretext, this picture is perfect; rich, harmonious, mellow, unctuous, translucent in quality, like cornelian and cairngorm; if we banish from our minds all the cock's-combry of observation, our ideas of green grass and grey rushes, it will fill us with delight, as indeed it does me, when I abstract myself sufficiently for the purpose; it belongs to another age, a different way of looking at things, a simpler and more confiding turn of mind that ours is, and it is essentially charming and beautiful. Much artistic peace of mind rests with Old Crome in his grave, and I will now turn from his work to another era, this fretting, restless, ever-searching world of modern art. Here we find ourselves amongst all sorts and conditions of men—high life and low life, the soldier, the sailor, the fisherman and ploughman, the milkman and washerwoman, even the clown and circus rider are depicted, and each with a thorough knowledge of the subject, and complete mastery of all its peculiarities. Modern art is not an elegant recreation, and except in the case of the portrait painter, it is persecuted in the face of every sort of trouble and difficulty. The indefatigable artist drags his canvas to the summit of almost inaccessible cliffs, or faces the keen east wind upon the lonely moor; he leads a terrible life of it with reluctant and capricious sitters; he has to persevere in spite of rebuffs and disappointments; he faces the insults of the vile rabble of Cairo and Damascus, and the jeers of the country yokel. Thoroughness and local truth are the watchwords of the day; and a modern exhibition, did anyone ever think of looking at it from that point of view, would present to him an amazing spectacle of energy and perseverance. This is a very different state of things from that which obtained at the commencement of the century. The causes of the change are no doubt very complex.

I can remember the effect produced upon the astonished world by the publication of the two first volumes of "Modern Painters;" it was a revelation and a new gospel to the world of art. They were enjoined to shake off the very dust of old conventionalism from their feet, and to go forth to nature, rejecting nothing and scorning nothing. Everyone who is interested in art knows the history of the so-called Pre-Raphaelite movement, and it is interesting in this exhibition to see some of its earliest efforts side by side with the works against which it was intended as a practical protest. I don't think it possible for any dispassionate and unprejudiced person to pronounce the two works by D. G. Rossetti, "The Loving Cup" and the "Lady Lilith," or the scene from Keats's "St. Agnes's Eve," by W. Holman Hunt, as in any one particular more true to nature than those of preceding artists, even the veriest conventionalist of them all. It is very strange, after all these years, now that the dust and smoke have cleared away, to observe how little there was at the bottom of it, after all. Rossetti and H. Hunt had to educate themselves, and did so, into great artists, by travelling the self-same road, and going through the same experiences as all the others; it was not by going to nature and seeing for themselves that they did it, it was by observation and study of art, by consulting the living oracles which have been handed down to us by the great men of the past. In Keats's lines, which W. H. Hunt's picture is intended to illustrate, we are told of Porphyro and Madeline that—

They glide, like phantoms, into the wide hall,
Like phantoms to the iron porch they glide,
Where lay the porter, in uneasy sprawl;
The wakeful bloodhound rose and shook his hide,
But his sagacious eye an inmate owns, &c., &c.

This is hardly conveyed in the picture, and it must also be confessed that neither the youth nor his bride possess either forms or features such as are calculated to inspire a poet's song; the architectural construction of the building from which they are escaping is also of so remarkable a kind, that short of adopting the impossible suggestion that the hero and heroine came down the chimney, we must abandon all hope of accounting for their presence. I mention these defects in no spirit of disparagement, but merely to prove a conclusion, which all the world has long since arrived at, that the pre-Raphaelite movement at its starting attempted an impossible thing, a thing no less impossible than for a man not to live in his own age or think with the thoughts of his own time; that the movement as it became modified by the teachings of common sense and the taste and genius of the men who originated it, did eventually bring about much greater earnestness and more scrupulous attention to individual truth, no one can deny, and if we seek for a monument of that progress we have only to look round this Exhibition. But other influences have had their share—and that of photography is undeniably evident. Art, in its primary and most important function, is a language for expressing ideas, and we may accept as an axiom, that its rank depends on the dignity and importance of the ideas conveyed by it. The noblest art which treats of humanity, is that which

represents the noblest attributes of man; the Greek placed him before us in the utmost conceivable perfection of strength and beauty; the fifteenth century Italian depicted him as a spiritual creature; and the vault of the Sistine Chapel, where Michel Angelo, with matchless technical skill, unfolded the long history of man's redemption and the certainty of expectation which for ages preceded the advent of his Saviour, stands unrivalled as the highest monument of art. But art, though essentially only a language, a means and not an end, is of itself difficult to acquire. Men, whose eyes are not trained, see things in the round; without the special habit which art engenders, and which is even in some cases impossible to acquire, they do not see things which are in different planes in one focus of vision. They see the tram-car, but not the street beyond or the sky above; they see objects and not pictures; and when photography steps in and reduces nature to a flat surface, it is a wonder and an astonishment, and to the artist it unquestionably saves much trouble. The sharp, incisive rendering of details which will bear the scrutiny of the microscope, is imitated by the artist as far as his powers permit, and in the drawing of waves and cloud forms—things too changeable to be copied by hand—he gets much valuable assistance from the photograph. But this can obviously never take the rank of an art, as it is mindless, and can in no sense express ideas, the fundamental function of art. In the fluctuations and changes of thought which are for ever going on like the abrasions of the soil we stand on, it has come about that in foreign schools of art, more and more importance has been attached to what is known amongst artists as the local value of tones, i.e. the exact amount of difference in point of lightness and darkness which objects of different colours have with reference to each other. In following this out the vividness of colours has often been so far subdued that many pictures, as may be seen in the foreign section of this Exhibition, have been resolved into a composition of slightly tinted greys. These tonists, as the artists abroad are fond of styling them, have not been without their influence on our English school—as may be observed in J. B. Kennington's very clever picture "Caught in the Act," in the two pictures by M. Logsdail, and in the charming Venetian scenes by Hilda Montalba and C. Wyllie. In these pictures, however, our insular love of colour asserts itself. What tonism can resolve itself into amongst less impressionable colourists can be best seen by studying the works of Paul Maris. One of the most charming pictures of the Exhibition, to my mind, is "Critics," by William Small. A young lady is seated on the sea shore with a sketching easel and canvas before her; behind her, absorbed in wondering and slightly scornful contemplation, stand an old woman who is knitting and fisher girl who has been gathering mussels. The drawing of all the figures is truly admirable, but the original touch in the picture, the true stroke of genius, is the view of the scene the lady is sketching which is depicted on her canvas. This completes our circle of vision, and brings the whole locality vividly before our eyes. We see both

what is behind and what is in front of her. Every work of this artist is full of power and originality; and it is perhaps excusable in a specialist to lament that so much of his time has been devoted to book illustration. A separate and very voluminous essay might be devoted to modern landscape art. From the evidence of this Exhibition, where Turner is not seen, or rather, hardly seen, by comparison with landscape art of an earlier age, we should be made conscious that that of recent times had been subjected to some mighty unseen influence; and just as it has been said that if Latin had utterly perished, from the evidence of the French, Italian, and Spanish languages it would be possible to infer with certainty of its previous existence, so we could equally infer from the evidence of the landscapes in this Exhibition, of the previous existence of Turner. There is greater width and scope, a wider horizon, more travelling of the restless clouds, more agitation and more movement, than in the works of Crome, Wilson, or Cotman. "A storm coming on," a very beautiful landscape by H. Clarence Whaite, is as certainly the offspring of Turner's example as *padre mio* is derived from *pater meus*, and so with the works of H. Moore, A. Hunt, and a host of others. Alongside of this, the grander view of nature, and struggling to assert itself with growing force and with increasing charm in every effort, is that truly English love of nature in her placid moods, that contemplative enjoyment which makes her so dear to the sportsman, and which has converted the banks of the Thames into a long panorama of picnics; one of the most exquisite renderings of this latter feeling is A. Parson's "Quiet Day." The sky is grey, but full of colour; the willows cut sharply against it, and close under the bank of the river, the water is rippled in circles by a rising fish, everything else seems at rest. The "Ferryman's Daughter," by Yeend King, the "Water Lilies" of Aumonier, and indeed many other works illustrate this turn of mind. By a complicated but not unnatural association of ideas, my thoughts are brought round to Thomas Bewick, whose

portrait, by Good, is certainly both one of the most interesting and one of the best pictures in the collection. An artist of great eminence once told me that he could discern little merit in Bewick's work. After much puzzling over that confession I have been forced to relegate it to the domain of insoluble problems, with the square circle and the perpetual motion, and with humble submission to superior genius and power, I must respectfully protest that Bewick has sounded every keynote of landscape art; almost every incident of rural life seems to have been noticed and pourtrayed, and were I seeking for some irrefragable proof of the Englishman's innate love of nature and delight in her for her own sake, I would instance the lives of Thomas Bewick and Gilbert White of Selborne. Good's portrait is undoubtedly a life-like portrait of the grand old artist and naturalist, and it is a fortunate circumstance that the city of Newcastle has been able to secure for her Jubilee Exhibition an authentic portrait of one of her worthiest and most distinguished citizens.

Space will not permit of my going further into my examination of this Exhibition, all I have endeavoured to do is to call attention to the various tendencies displayed by the works exhibited; a detailed description of them would be a very arduous and protracted task; and after all it would be a thankless one—words are incapable of conveying an artistic idea; the writer, after pages of ineffectual effort, must, to make his meaning clear, request his reader to go and see for himself—as Horace says—

Segnus irritant animos demissa per aurem,
Quam quæ sunt oculis subiecta fidelibus et quæ
Ipse sibi tradit spectator.

The mind receives much more slowly through the ear, whereas impressions conveyed to the eye appeal at once; and so, in conclusion, I can advise the reader, as the truest method of enlisting his sympathy and admiration, to pay a visit to the Exhibition and judge for himself.

NATIONAL & INTERNATIONAL EXHIBITIONS.

[BY PROFESSOR P. L. SIMMONDS.]

One of the most characteristic and noticeable features of her Majesty's reign is perhaps the establishment of great International Exhibitions, which have gone the round of all the civilised countries of the world, and have been mainly instrumental in carrying out many beneficial results.

Public gatherings of men to dispose of their wares and to compare notes had, it is true, been held long previously, for this was the object of the great public fairs held in Europe and England, which have now been almost entirely superseded by these frequent exhibitions and the facilities of speedy intercommunication by steam vessels and the telegraph by land and by sea.

Public exhibitions of arts and manufactures on a small scale had been instituted in England and France long ago, but the initiation of great International

gatherings is due to the thoughtful foresight and individual exertions of the Consort of her Majesty the Queen in 1851. France had shown to herself and to Europe before that what she herself could accomplish, but she had shrunk from permitting other nations to exhibit their achievements in contrast with and beside her own.

National exhibitions had frequently been held in almost every great capital in Europe, and even in the small principalities. The old-established Society of Arts, Manufactures, and Commerce, of London, had always taken much interest in industrial and artistic progress, and has continually lent its aid and the useful and experienced advice of its council and members to all exhibitions home and foreign. In 1846 the Prince Consort was elected president of the Society, and almost his

first advice was to encourage the application of fine arts to our manufactures. H.R.H. the Prince of Wales, who has succeeded to his father's place as president of the society, has been equally active and energetic in exhibition labours, and has lost no opportunity of giving his patronage and aid to all useful undertakings of this class. Ours is an era of exhibitions, and its Hégira dates from a meeting of the Society of Arts, held in Buckingham Palace, in the summer of 1849, when the Prince Consort explained the outlines of that great scheme which owed so much of its subsequent success to the rare administrative ability of its author and founder. At that meeting Prince Albert not only suggested the grouping of the exhibits into four main heads—raw material, machinery and mechanical inventions, manufactures, and sculpture and plastic arts—but also suggested the world-known site in Hyde Park for the Exhibition of 1851.

Coming as it did at a time when the world was full of the new discoveries of Science, when the railway had just got its web of lines fairly spread over the country; when the telegraph was commencing to stretch across the sea as well as over the land; when chemistry was meditating the conversion of enormous masses of foul waste into products of use and beauty, and photography was ceasing to be a mere scientific curiosity, this Exhibition taught men how enormous were the powers for their use and benefit which nature, and the knowledge of nature, placed at their disposal.

Those who, like the writer, can look back to this first Exhibition, and having had the advantage also of seeing and being officially occupied with all subsequent ones, must admit that there has nothing been carried out since to equal it in the fairy-like character of the glass building (which still stands at Sydenham) or the nature of its contents, arrangement, and the general effect of the first impression on entering. Larger and more ambitious Exhibitions have since been held, but the difficulty has been to keep them within reasonable limits, for by their hugeness they are absolutely fatiguing to the public, and difficult to examine and obtain any profitable information without great delay, labour, and fatigue from the variety and confusion of arrangement, and the multiplicity of objects to be inspected.

Originally intended to take place at decennial periods, this plan was soon departed from in the eagerness of different countries to participate in the successful idea which had been so admirably carried out.

The first to follow in the train was Ireland. The Royal Society of Dublin had held triennial industrial exhibitions from the year 1835, but in 1853, a public-spirited citizen, Mr. Dargan, placed £20,000 in the hands of that Society to hold an exhibition available for manufactures of the three kingdoms, and this sum he ultimately increased to £80,000, and foreign objects were also admitted.

It may here be incidentally stated that as early as 1839, and again in 1849, upon occasions of meetings of the British Association for the advancement of science, Birmingham had organised exhibitions of its multifarious manufactures.

The next country to follow with an exhibition

was the United States, in 1853. In that year an exhibition was held in New York, which "was designed to draw forth such a representation of the world's industry and resources as would enable America to measure the strength and value of her own, while it indicated new aims for her enterprise and skill." The building, which was of glass and iron, was of an octagonal form with annexes added. This glass and iron mode of construction, first suggested and carried out by Sir Joseph Paxton in Hyde Park, has since made the circuit of the globe, having been adopted at Paris, Munich, Amsterdam, Antwerp, New York, Philadelphia, Sydney, and Melbourne, the buildings there being all modifications of the great example of 1851.

In 1855, an International Exposition was held at Paris, under the auspices of the Emperor, in the building which still stands in the Champs Elysees, known as the Palais de l'Industrie. Several annexes had, however, to be provided, for as Prince Napoleon observed, the British Commissioner, Sir Hy. Cole "interrogated as to the space they would require, replied that England would want the whole area provided for the Exposition." Although this demand was somewhat exaggerated, Great Britain eventually occupied about one-third of the available space, France reserving as is usual with the originating country, one-half for itself. It is curious to trace the progress of the imitative character, which results in the copying of a novel or successful idea. Thus we find that after a Fisheries Exhibition had been held at Bergen, in Norway, in 1855, it was followed by similar exhibitions at Boulogne in 1866, at Arcachon and the Hague in 1867, at Havre in 1868, Berlin in 1880, the East Anglian Exhibition at Norwich in 1881, and one on a larger scale at South Kensington in 1883. So with Sanitary and Health Exhibitions, which, commencing with 1881 at South Kensington, were carried on at Newcastle in 1882, Glasgow and Berlin in 1883, and South Kensington at the Healtheries in 1884.

Again, with workmen's and industrial exhibitions, almost every great town and the various districts of the Metropolis have had their gatherings, widening the interest taken by the public in all such displays of patient skill, ingenuity, and application of talent and art of a more or less skilful character.

Ingenuity has also been brought to bear upon every branch of industry or idea, that could lead to the formation of a collective exhibition, and the changes have been rung upon applied art and science, building trade and its appliances, labour saving appliances, smoke abatement, fine arts, ecclesiastical art, art furniture, naval engineering, electrical inventions and appliances, sportsmen's exhibitions, &c.

In the few years which followed 1851 there was a sort of lull or interregnum, for besides a few national exhibitions here and there, there was nothing special to notice until the recurrence of the decennial International Exhibition at London in 1862. Mention may, however, be made of an interesting and successful Exhibition of Fine Arts and Fine Art Manufactures held at Manchester in 1857, and an admirable display of Italian industrial resources held at Florence in 1861, which combined industry, fine arts, agriculture, and horticulture, but

this could scarcely be termed an international one. An Art Treasures Exhibition was held at Edinburgh in that year, another Art Exhibition at Dublin, a Fishery Exhibition at Amsterdam, and an Inter-colonial Exhibition at Melbourne of Australian produce and manufactures intended to be sent to the second great London Exhibition.

The arrangements for the second International Exhibition in London were in an advanced state when the untimely death of the Prince Consort in December, 1861, was a sad blow to its anticipated success, and much disheartened all those officially concerned in its arrangements. Still it was carried to completion, and was popular, although a failure commercially, and would have entailed a loss upon the promoters, the Commission, but for the liberality of the contractors of the building, Messrs. Kelk and Lucas, who met the deficiency and took over the building, which was ultimately re-erected in the north of London as the Alexandra Palace, intended to be a rival to the Crystal Palace in the south.

It is not necessary to comment freely on the arrangements of the Exhibition of 1862, though much was wanting to ensure success. There was too much of red tape and military influence in the general arrangement, and difficulties arose in carrying out the centralising orders issued, which led to Sir Hy. Cole having to be called in as an adviser to set matters straight previous to the opening, and he allowed the several superintendents more liberty of independent action, the writer having in that year the charge of the Colonies.

The year 1863 was ushered in with a rush of International Exhibitions. A very successful one was held at Dublin, promoted in a great measure by the liberality of Mr. Guinness, the brewer, one of its leading citizens. The general arrangements in this were satisfactory, and attended with great success. Foreign countries made a fair representation, especially Italy, Holland, Scandinavia, and France, and a good collection of pictures was got together through the aid of influential delegates sent on a tour throughout Europe. A complete description of the rise, progress, and results of this Exhibition, I published soon after its close in a large volume, with illustrations, valuable statistic, and the several reports of the juries.

I was appointed superintendent of the Colonies, there, and managed to gather a fair representation of their products and manufactures, though none were disposed to contribute largely towards an Exhibition in the Irish capital. There were also a number of competing exhibitions in the same year, one at New Zealand, held at Otago, in the town of Dunedin, for which, as London manager in 1864, I had been able to send out numerous exhibits, and this first colonial effort was attended with much success, and has in subsequent years been followed up by other exhibitions, provincial and international, in different towns of that thriving colony. An International Exhibition was held at Oporto in 1865, for which I was appointed London Manager. There were also exhibitions held at Stettin, a Fisheries Exhibition at Bergen, in Norway, an International Art Exhibition at Amsterdam, and an Industrial and Fine Arts Exhibition at Wakefield.

The following year, 1866, saw a Fishery Exhibi-

tion carried out at Boulogne, an International Exhibition at Rio Janeiro, and two European National Exhibitions—an Industrial one at Stockholm, and one for Fine Arts and Industry at Rochelle, in France.

The year 1867 inaugurated two Fishery Exhibitions—one at Arcachon in France, and the other at the Hague; besides an Exhibition of Indian products, Arts and Manufactures, held at Agra, in the North-West Provinces of India. But it is chiefly noticeable for the great Paris International Exhibition, promoted and liberally encouraged by the Emperor Napoleon, and carried out on a vast and very systematic scale—occupying the Champs de Mars—with annexes for the agricultural section at Billancourt. This Exhibition was a brilliant success in all respects, from the number of countries which took part in it, the excellence of the arrangements, the magnificence of the receptions, and the number of the Royal personages who attended it. From having the superintendence and arrangements of the principal Australian and West Indian Colonies there, acting as juror and having to draw up the report of my class on Forest Products, for publication, I was necessarily busily occupied and well able to judge of the system of classification, plans and results. In a cursory superficial account of this kind, however, dealing with so many exhibitions, it is impossible to enter into details, or to enlarge on many important topics.

In 1868, there was nothing of much importance in the way of exhibitions. A Maritime and Fishery Exhibition at the port of Havre was interesting and successful, for which I acted as British delegate and juror. It is noticeable as being the first to adopt the principle of allowing the exhibitors to nominate their own jurors, the Commission or the Government having previously nominated and paid jurors for their services. This plan of exhibitors nominating their jurors has not, however, in principle acted well. The exhibitors too often apathetic or ignorant of suitable men, have left the nomination to the paid agents acting for them, and these wishing to serve their employers and clients have frequently endeavoured to pack the juries and get men appointed quite unfit for their duties by proper knowledge or experience. Indeed, the system of rewards at exhibitions is one requiring grave consideration. If actual medals of gold, silver, or bronze are given, it entails a very serious outlay, especially at a great international exhibition. If representative medals or diplomas are given, there is the same straining after the highest award by every exhibitor, and it is impossible to draw the line closely between competing firms: hence much jealousy and heart-burnings arise out of the decisions. Every exhibitor considers he is entitled to a gold medal, or first class award, however insignificant his exhibit may be, and as these awards are mainly used for advertising purposes, it would be far better to abolish them altogether, substituting published reports by competent experts as to the character of the products and manufactures shown. As the admission of exhibitors is not now a question of judicious selection of the most important and attractive, but obtainable by

payment for space, a commemorative medal or diploma to all might be given without great expense.

To return from this digression, there was an art exhibition held at Leeds in 1868, and a Roumanian Exhibition at Bucharest. At that time the present Lord Reay, now Governor of Bombay, an active and intelligent philanthropist, then known as Baron Mackay, set on foot the idea of an international exhibition of domestic economy, to be held at Amsterdam, in a glass building recently erected. Visiting the Metropolis and interesting the Lord Mayor and the Society of Arts in the scheme, a London committee was appointed, and I was invited to undertake the duties of British Commissioner and juror. The object of the exhibition was to improve the condition of the working classes ; to gather together all information relating to their welfare, living, moral and social condition, the working of co-operative societies, prices of food, clothing, dwellings, wages, &c., in different countries. His Majesty the King appointed the jurors, and some valuable reports were drawn up and published, and the results of this exhibition, held in 1869, were deemed exceedingly satisfactory. In the same year an exhibition was held at Altona, a maritime exhibition at Naples, and an art exhibition at Munich.

In 1870 a National Argentine Exhibition was held at Cordova, an Exhibition at Cassel, another at Altona, a Russian Industrial Exhibition at St. Petersburg, and a commencement was made of Class and Trade Exhibitions by a Leather Trade Exhibition at Northampton, and a Workmen's Exhibition at the Agricultural Hall, London, which was opened by his Royal Highness the Prince of Wales.

Finding it impossible to carry out another great decennial Exhibition in London, an effort was made by Sir Henry Cole to originate annual International Exhibitions, each devoted to a small series of manufactures, with processes and machinery in operation. These were continued from 1871 to 1874, at South Kensington. Endeavours were made to popularise information, by short explanatory descriptive lectures, which I was engaged by the Commission to give in the different Courts. These Exhibitions were found, however, to be so dull and unattractive, that they failed to draw the public, and all that resulted from them was a series of useful published reports, drawn up by experts.

In 1872, an International Exhibition was held at Moscow, one of Industrial Arts and Manufactures at Dublin, an Exhibition at Lima, and, strangely enough, one of art objects at Kioto, in Japan.

In 1873, a great International Exhibition was held at Vienna, for which much success was anticipated—the plan and general arrangements being good, but the distance, the expense of living, and an outbreak of cholera there, rather interfered in preventing exhibitors, and it was not financially successful.

An International Exhibition was held at Melbourne, in which the adjoining colonies took part, and at the Agricultural Hall, London, a Food Exhibition was held, which has been followed from time to time there in subsequent years by small class

interesting exhibitions of trades and manufactures lasting for a few weeks.

In 1874, an Exhibition of National Art and Industry was held at Brussels, and another of Arts, Industry, and Commerce at Rome.

1875 developed two exhibitions—an International Maritime Exhibition at Paris, and an International Exhibition at Santiago, Chili ; this, however, was too distant to be largely patronised.

The year 1876 was noted for only two exhibitions deserving of mention, the successful International one at Philadelphia, and an important loan collection of scientific apparatus and appliances gathered together in the galleries of South Kensington, which was curious and interesting in a scientific point of view from the variety of objects shown, but did not receive much patronage from the public. There was also in that year an exhibition of life-saving appliances at Brussels.

In the following year Paris set on foot an Electric Exhibition, which was the forerunner of many subsequent ones, designed to bring under public notice many novelties and improvements which have gradually led to the extensive adoption of electric lighting for private and public use at home and abroad.

The year 1878, as regards exhibitions, was monopolised by the third great International Exhibition at Paris, which was carried out on a very extensive and comprehensive scale, and in this most of the principal nations took part. Notwithstanding its extent and variety, it had not, however, the prestige and popular reputation of its predecessor, conducted under the influential auspices of the Emperor.

The year 1879 was characterised by two International Exhibitions—one held in Milan, the other at Sydney, the latter being the precursor of a round of International Exhibitions held in each of the different Australian Colonies and New Zealand in succeeding years.

With the year 1880 International Exhibitions increased rapidly in number in all directions. In 1881 I was engaged by the Crystal Palace directors to originate and carry out a series of annual International Exhibitions. The first determined on was a wool exhibition there. This industry having long been a special one fostered in this country, London being the central mart of the wool sales, our colonies being the largest producers of the finest wool, and all nations being interested in the production and use of wool, it was thought it would prove attractive. After a tour through the Continent I was enabled to gather together an admirable and instructive display of wool in all its stages from the shearing the sheep on the ground, to the washing, spinning, weaving, and applications of wool to all purposes. The Drapers' and Clothworkers' Companies and the directors of the Palace offered liberal prizes ; and never was a more complete and interesting show of working machinery got together. The exhibition, however, did not prove remunerative. The sightseeing public preferred their fine central promenade as it stood to its being filled with working machinery. In a technical point of view it may have done good, but it did not draw visitors. The year after, it was succeeded by an Electric Light Exhibition, and this was followed by a com-

parison of gas and electricity, and these proved great successes, as the Paris Exhibition of 1881 had done.

The South Kensington authorities, in 1881, held two exhibitions, one on Smoke Abatement Processes and the other on Medical and Sanitary Appliances.

In 1882 there was a Sanitary Exhibition held in Newcastle, and one of Naval Architecture at Tynemouth. A small exhibition on Naval Engineering was also held at the Agricultural Hall, London. On the Continent, there was an exhibition at Trieste, and an International Exhibition of Industrial Art at Lille.

In 1883, the South Kensington authorities set on foot the series of annual class exhibitions, which terminated last year with the Indian and Colonial. The Fisheries Exhibition was the first, and it owed its success to the energy of Sir Edward Birkbeck, resulting in a considerable profit. Glasgow followed the idea of Newcastle with a Sanitary Exhibition. Some small brief Trade Exhibitions, which had become popular, were held at the Agricultural Hall, London, the Building Trade, the Furniture Trade, and Sport and sportsman's appliances being dealt with. Several important International Exhibitions were held in that year. An American and International one at New Orleans, a large International one at Calcutta, being the culminating speculation of a Mr. Joubert, who had previously gone the rounds of the Australian Colonies and New Zealand establishing exhibitions. An important International Exhibition was held at Amsterdam, in which, acting as British Commissioner, I was able to enlist and give satisfaction to a large collection of British exhibitors.

In 1883 an Electric and Industrial Exhibition was held at Prague, and another at Vienna, whilst Madrid carried out an Exhibition of Mining industries and Metallurgy.

In 1884 the second of the annual series at South Kensington was established by what was known in common parlance as The Healtheries. The Crystal Palace attempted another International gathering of Fine Arts and Industry, in this instance charging exhibitors for space. Edinburgh established also a Forestry Exhibition. Abroad there was an Electric Exhibition at Philadelphia, and on the Continent a Maritime Exhibition at Marseilles, International Exhibitions at Nice and Turin, a Hungarian National Exhibition at Budapest; whilst I had charge of the British section in a very successful exhibition at Antwerp, the planning and arrangements of which were admirably conducted by a company, and so varied were the attractions offered that it resulted in a profit of £40,000.

In 1885 the third of the South Kensington series, the Inventions, was held, and an attempt was made to hold an International Exhibition at the Alexandra Palace, which proved an utter failure. This unfortunate building seems to be fatally doomed. Indeed, there is no room for public buildings of this kind in different suburbs of the metropolis. The Crystal Palace, with all its early prestige and large expenditure and beautiful grounds, cannot pay its way—and is yet

threatened by another rival, the People's Palace in the East of London.

Last year witnessed four exhibitions in Great Britain: International Exhibitions at Edinburgh and Liverpool, an Art Exhibition at Folkestone, and the great Colinderies at South Kensington, which, considering the millions of visitors it drew, the patronage and privileges it enjoyed, the free buildings in which it was housed, and the large sums expended on it by India and the Colonies, should have proved a great financial success. The balance sheet so tardily published does not, however, show this, and it seems strange that a private speculation like the Antwerp Exhibition, with expensive buildings to erect, grounds to clear and lay out, and with only half the number of visitors, should be able to close with a larger balance of profit. Little need be said of the other exhibitions of the year. The Edinburgh one was a success, the Folkestone undertaking a fiasco, and the Liverpool Exhibition a failure financially, which was not to be wondered at, when the Executive blundered in every direction for want of the aid of any one who had had experience in previous exhibitions to guide them. As they are trying again this year, it is to be hoped they will profit by past errors, and be more successful.

That there is still a craving or desire for exhibitions is apparent from their frequent occurrence. The cry is still they come. This year at home and abroad they abound. In London, the American Exhibition has the field to itself, and will doubtless profit by it, possibly we shall be flooded with American inventions and Yankee notions. But in the provinces, besides Liverpool and Newcastle, there are exhibitions at Manchester and Saltaire.

On the Continent there are exhibitions at Barcelona (international), a Maritime Exhibition at Havre, a Railway Exhibition at Paris; an International Exhibition at Adelaide, South Australia, with a similar one to follow shortly at Melbourne.

As a conclusion of this retrospective survey, the question may be and is often asked—What good have exhibitions done—what benefits have arisen from them? To this I may reply that new markets have been opened up all over the world since 1851—in China and Japan, Burmah and Arabia, in Africa and America—and our trade has enormously developed. We are the carriers of the world, and shorter and quicker routes have been found, whilst the extension of railways and telegraphs over India, Australia, and America have placed within our reach, at cheaper prices, larger supplies of food and raw materials, which are exchanged for our manufactures.

Among others the taste for the beautiful has been spread broadcast all over the earth, and art has become the ally and not the antagonist of industry. Exhibitions have given rise to the entire group of artistic industries. Applied art and applied science have been widely diffused. Foremost as Great Britain has ever been in textile manufactures and metallic industries, she was very backward in technical knowledge and artistic taste. We had not the free art schools and technical classes which

the continental artisans had so long enjoyed and benefited by, but we are now rapidly supplying this educational want, and giving our workpeople, where they will avail themselves of them, equal advantages with their continental rivals.

The eyes of our manufacturers, too, have been opened to the benefits to be gained by inspection and comparison with others, by economy of labour, the employment of improved machines, the introduction of new products, and the utilisation of waste substances formerly overlooked or neglected.

Exhibitions have also been the means of stimulating into exertion and liberality the apathetic guilds and livery companies of London, originally established to promote, protect, and aid special trades. Thus, exhibitions and aid have been given by the Clothworkers, the Drapers, the Coachmakers, the Horners, the Ironmongers, the Paper Stainers, and other companies. Some of these wealthy bodies have been stimulated into large grants for the promotion of technical education, and other improvements of the trades with which they are allied. In the words of the princely founder of International Exhibitions, we begin at length to realise how much the world is a gainer "by peace, love, and ready assistance, not only between individuals, but between the nations of the earth," and slowly but surely draw near to "that great end to which all history points, the realisation of the unity of mankind. Not a unity which breaks down the limits and levels the peculiar characteristics of the different nations of the earth, but rather a unity, the result and product of those very national varieties and antagonistic qualities."

Much benefit has resulted from the large diffusion of information in exhibition literature. Not only have valuable descriptive official accounts and statistics been furnished and published by each exhibiting nation, but special handbooks, with maps and popular information, are largely distributed by each country and colony. Conferences are held, and a vast amount of practical information is thus diffused, so that they become, as it were, educating schools. It is now a common feature to see a professor or schoolmaster with his class making the tour of an exhibition, and giving, as it were, instructive object lessons on the three kingdoms of nature, and on manufacturing processes and raw materials, with all the objects present for illustration.

We have been forced to encourage and promote art designs and technical education if we expect to hold our own in competition with Continental nations. The expansion of our commerce has been met by keen rivalry from countries whose artisans work longer hours at lower wages, live cheaper, and are more thrifty and frugal in their habits than unfortunately the bulk of our working classes are. Hence, foreign producers are able to undersell us in many markets. But British enterprise, and the high quality of our manufacture enables us to compete manfully against all disadvantages. An objection has been urged that we have injured ourselves by exposing our trade

secrets so freely to the world. But there are now no trade secrets; and all countries are so far on an equality, that the Patent Laws and the press soon give publicity to any new discoveries which are adopted and employed by any who choose under arrangements and royalties. In fact, our ship-builders and manufacturers receive orders for warships, arms, improved machinery, railway plant from almost all foreign countries, and the publicity is therefore beneficial in advancing our various industries—of which Lancashire, Yorkshire, and the Tyne district are striking evidences.

A passing word or two may be added on the great difficulties attendant on the conception and successful completion of an exhibition. Great international exhibitions set on foot and carried out by a Government have had their day, and have broken down from the enormous incidental expenses attending them. They have grown too large and cumbersome from the desire of every nation to participate and occupy a considerable space for which they have nothing to pay. Hence they have been invariably attended with heavy loss—and neither England, Germany, America, or other Governments, are prepared to face the financial difficulty of a heavy deficit.

France is the only nation which is willing to incur the large outlay required. But for this there are two reasons: first, the desire of the Government to keep a restless and turbulent population, clamouring for war, quiet; and, secondly, the hope of drawing vast crowds of visitors to their pleasure capital, which results in benefit to trade. They have, however, made a sad mistake in announcing their proposed International Exhibition in 1889 as commemorative of the Republic. This has led to most of the monarchical nations declining to take part in the gathering, and the French Ministry are, therefore, wisely thinking of deferring their exhibition for another year, when it is to be hoped peace and prosperity may smile on the effort, for of all nations they understand best the mode of carrying out an exhibition.

Failing the renewal of Governmental exhibitions, the task of continuing them has fallen into the hands of private individuals and speculators, who carry them on either by means of a guarantee fund or a limited liability company. A charge for space has to be made to exhibitors, and this and the gate money, and certain concessions, are looked upon to cover the attendant expenses, and as sources of profit.

This is a hazardous and heavy responsibility, which reflects credit on those who undertake the difficulties of carrying exhibitions to a successful issue; for these lead to more pleasure and profit to the public at large than to the originators.

I should have liked to have added a few remarks expressive of high approval of the general arrangements, of the forward state of readiness of the Exhibition, and on the numerous novelties and prominent features which are sure to attract large numbers of visitors, but this subject is better left in local hands, especially as my essay has already run to greater length than I had intended.

PART III.

THE OPENING CEREMONIES.

Reprinted from "The Newcastle Daily Chronicle," of May 12, 1887.



INAUGURATION BY THE DUKE OF CAMBRIDGE.

It is with the utmost satisfaction that we record the complete success of the inaugural proceedings at the Newcastle Royal Jubilee Exhibition. The gathering of people, both in the building and in the thoroughfares outside, was an enormous one—indeed, many gentlemen experienced in estimating the numbers of large bodies of men declare it to be the greatest assemblage that has ever been witnessed in Newcastle. Again, the Royal visit was an exceeding pleasant episode in the proceedings, from whatever point of view it may be regarded. The people were most cordial to Duke George of Cambridge, and his Royal Highness, who came charged with kindly messages from her Majesty the Queen, appeared to be in the highest degree gratified by the warmth of the reception which he everywhere met with. Certainly, no parallel can be found in the annals of this ancient place to the scene which was witnessed within the walls of the Exhibition yesterday. Close upon 19,000 season tickets had been sold before the opening of the portals in the morning ; and of this large number of persons entitled to admission, only a few hundreds could be reckoned upon as absent. In addition, there were on the spot some 2,000 persons concerned in the undertaking, as exhibitors, employés, or officials ; so that it is quite certain that there were well over 20,000 people within the edifice when the formal ceremonial of throwing it open to the public was proceeded with. Such a success as this did not enter into the most sanguine calculations of the gentlemen who first conceived the enterprise ; and, as a matter of fact, the earlier plans for it were laid out upon a basis of moderate outlay, which has somewhat contracted its operations. Could the enormous success which the Exhibition has already achieved have been foreseen, there can be no question that the building itself would have been designed on a larger scale, and its equipments and appointments would have been relatively more perfect and complete even than they are. But there were unanswerable reasons for the avoidance of a policy of speculation on the part of the managing body. The trade of the district had for three years and more been at a very low ebb, and men's incomes, from those of the wealthiest to those of the humblest, had suffered considerable reduction—indeed, in too many instances had almost entirely faded away. There was also in prospect at the time a difficulty in the Northumberland coal trade which is even now in an acute stage ; and thus no good and sufficient reasons could be advanced why

a building and grounds of twice the extent which sufficed for such an undertaking as the one which was so successful at Edinburgh should be provided. But it can now be seen that, had anything resembling a forecast been obtained of the enthusiasm with which the whole of the North country would rally to the support of the project, a structure and gardens of the extent referred to might have been called into existence with the utmost certainty of realising success. It may readily be imagined that the promoters and executive officials of our Exhibition under-rated their own influence, as well as their capacity for bringing the adventure to a fortunate issue. The results that have up to this time been obtained testify to the sterling ability and organising power of the gentlemen at the head of affairs, and our citizens have every reason for pride in the circumstance. It is at the present moment too early to single out the names which will hereafter be specially associated with this great work ; but everyone knows that there has been concerned in guiding its course a band of workers as able and as zealous as have ever taken part in our public affairs. To these capable organisers due credit must in time be given, for without their services our Exhibition would probably have been very different indeed from the magnificent affair that it is ; and it also might have occupied a very different position in the public estimation. Taken as a whole, the surroundings of yesterday's festivities were highly conducive to the thorough enjoyment of the great bulk of the people. Rain had fallen rather liberally overnight, and the morning opened with lowering skies, and a warm, though damp, atmosphere. However, the threats of rain really amounted to very little, for until the proceedings of the day were over, only a few scattered drops fell at intervals. The inhabitants of the surrounding district were not deterred from visiting the city by the threatening weather, nor did the sombre skies detain within their homes our deeply interested citizens. No more rain than served to lay the dust upon the roads actually fell, and a pleasanter May day no one could have desired. The Mayor of Newcastle had advised a general holiday for the occasion, and the response on the part of the manufacturers and tradesmen to his appeal was, generally speaking, an affirmative one. Very few shops were open in the main thoroughfares of the city, save those devoted to the vending of refreshments to the multitude ; and all the great factories in the neighbourhood of Newcastle were laid in

for the day. His worship, however, did not recommend any general decoration of the streets in honour of our Royal visitor, and thus the show of bunting, which was actually made rather freely, was quite a spontaneous demonstration in honour of Duke George ; in fact, the streets, with flags and streamers scattered along them, and with their whole extent crowded by pedestrians, presented an aspect of the greatest animation. The carnival was one of the most popular that has ever been held in our city, and its incidents will remain long in the memories of those who took part in them.

HISTORY OF THE EXHIBITION.

ORIGIN AND DEVELOPMENT.

It is difficult to predict from the beginning of an undertaking what the ultimate realisation will be. In some cases, the result falls far short of, while in others it as greatly exceeds, the expectation and intention of its promoters. The latter has been the happy experience of the Exhibition which has been opened by the Duke of Cambridge on the Town Moor of Newcastle. As compared with its completed form, the first idea of that work was, indeed, modest and unpretentious. The credit of originating the movement is due solely to the North of England Institute of Mining and Mechanical Engineers, at one of whose meetings, under the presidency of Mr. John Daglish, towards the end of the year 1885, the idea found practical expression. All that was at the outset proposed, however, was to hold an exhibition of plant applicable to mining and mechanical engineering and of local industries, which it was believed would be productive of very beneficial results to Newcastle and district. The most feasible site for such a purpose, in the judgment of the Executive Council, was that of the grounds behind Singleton House, the consent for the use of which had been obtained from the Colleges of Physical Science and Medicine, with which bodies the negotiations for the purchase of the property, afterwards broken off, were then regarded as virtually concluded. The first honorary secretary, Mr. Theo. Wood Bunning, wrote, early in January, 1886, to the Mayor (Mr. B. C. Browne), asking whether it would be convenient for the City Council to receive a deputation from the Executive Committee at their next meeting, for the purpose of explaining in greater detail the objects of the Exhibition, and of seeking the approval and support of the governing body of the city to the project.

Himself a practical engineer, and already, *ex officio*, a member of the Executive Council, the Mayor readily assented to such an arrangement ; and the deputation, consisting of the Earl of Ravensworth, Messrs. John Daglish, Lindsay Wood, G. Baker Forster, J. B. Simpson, W. G. Laws, Frank C. Marshall, J. C. Ridley, Bunning, and C. Kenrick Gibbons, secretary, waited on the Council on the 10th of February. As described by the Earl of Ravensworth, who acted as spokesman on the occasion, the objects of the movement were to exhibit the most advanced appliances and products of the industries of the district, and to give the widest possible publicity to those appliances and products. There were, he went on to remark, no other means so efficient, so rapid, and so economical of bringing together the producer and consumer as an exhibition of that character ; and a great benefit to be derived from it would be to bring within the immediate knowledge, not merely of managers and foremen, but of workmen themselves, the best appliances in operation, not only in their own, but in other and competing districts. It was thought that the Exhibition would be especially important to our mining population ; and with the purpose of making the public familiar with that mysterious under-ground over which we lived, it was proposed that there should be a large working model of a mine, showing the system of ventilation, the system of

working, and, in fact, making the public acquainted with that which to thousands of our fellow-countrymen was absolutely at the present time a sealed book. Some of his lordship's colleagues expressed similar sentiments, and the deputation departed with the assurance from the Mayor that the matter would receive the most careful consideration on the part of the Council.

It had, at the outset, been intended to hold the Exhibition in 1886, but in view of the kindred projects which were in contemplation for that year elsewhere, it was subsequently determined to defer the event till 1887, and to associate it with the local celebration of the jubilee year of Queen Victoria's reign. Such was the hold which the movement, in this form, had already taken on the public mind, that an expansion and development of the primitive design soon became inevitable. In response to an application made by Mr. Bunning to the Board of Trade on the 10th of April, permission was given to announce the Exhibition as international and colonial ; and instead of the limited space afforded in connexion with Singleton House, the necessity for a special building and a much larger area of ground was brought home to the promoters. Among those who more prominently and actively identified themselves with the movement was the Mayor, who, with a view of giving it extended publicity, was chiefly instrumental in convening a meeting, over which he presided, on the 15th of April in the amphitheatre of the Literary and Philosophical Society. On the motion of his Worship, seconded by Mr. Daglish, it was resolved that the prospectus issued by the gentlemen forming the various committees should constitute the basis of the promotion and carrying out of the objects of the Exhibition, and that the various committees should have power to add to their number, subject to confirmation by the Executive Council. In this document, which was formally issued in July, it was stated that, in order to mark in the annals of Newcastle-upon-Tyne the Jubilee year of the reign of her gracious Majesty, it had been decided by an influential committee, called together at the invitation of the North of England Institute of Mining and Mechanical Engineers, to hold an Exhibition of industries, manufactures and products. It would be held under the patronage of his Grace the Duke of Northumberland, Lord-Lieutenant of the County, and under the presidency of the Right Hon. the Earl of Ravensworth. The industries, manufactures, and products of the neighbourhood alone were sufficient in number and interest to occupy a very important part in the exhibits. Mining, which is its chief industry, would be especially represented ; and it had been arranged that a complete full-sized working model of a mine should form a special feature of the Exhibition. As showing the varied and extensive scope of the project, the following divisions of proposed exhibits were also embraced in the prospectus.

Division.	Chairman.
1. Coal Mining and Products	G. B. Forster.
2. Metalliferous Mining and Products	Sir Lowthian Bell.
3. Machinery	W. Boyd.
4. Marine Engineering and Machinery and Naval Architecture	John Price.
5. Civil, Military, Railway, and Hydraulic Engineering	Thomas Wrightson.
6. Building Industries	Addison Potter, C.B.
7. Chemical Industries	Sir C. Mark Palmer, M.P.
8. Fisheries	
9. Agriculture, Horticulture, and Arboriculture	Jacob Wilson.
10. Hygiene	James C. Stevenson, M.P.
11. Food	John Robinson.
12. Sundry Industries and Products	John Philpott.
13. Art Industries	C. Mitchell.
14. Science and Education	Dr. T. Hodgkin.

In each of these divisions were embraced a number of classes, to each of which a separate chairman and committee were also assigned. An indispensable requisite of all such undertakings was, of course, the guarantee fund, towards which £5,000 had already been subscribed, and which, on the motion of Sir Lowthian Bell, seconded by Sir C. M. Palmer, was fixed at a minimum of £20,000. As the scheme was developed, however, it was found necessary to aim at a considerably higher figure. In

their appeal for public support on this head, the Executive were not disappointed. On the recommendation of the Finance Committee, to whom the appeal of the deputation had been referred, the Corporation of Newcastle unanimously committed itself to a liability of £5,000; the Tyne Improvement Commissioners consented to become responsible to the extent of £2,000; while the name of the Mining Institute was put down for £1,000. There also came promises of pecuniary support, if needed, from many other public and private sources, and in due time the commercial soundness of the scheme was fully established; the guarantee fund having reached a grand total of £34,552 10s. With accumulating duties, Mr. Bunning, after the undertaking had thus been fairly launched, retired from the office of hon. secretary, in which he was succeeded by Mr. J. H. Amos, so well known for his organising and administrative abilities, and who has recently been appointed secretary to the Tees Conservancy Commissioners. The following is a list of the Executive Council and of the leading officials of the Exhibition as they now stand:—

PATRON.

His Grace the Duke of Northumberland, K.G.

PRESIDENT.

The Right Hon. the Earl of Ravensworth.

EXECUTIVE COUNCIL.

John Daglish (chairman), Marsden, South Shields.
B. C. Browne (Mayor of Newcastle), 2, Granville Road, Newcastle.
Sir Lowthian Bell, Bart., Rounton Grange, Northallerton.
Wm. Boyd, 74, Jesmond Road, Newcastle.
Wm. Cochrane, Oaklands House, Gosforth, Newcastle.
G. B. Forster, Leasby, Northumberland.
W. G. Laws, 5, Winchester Terrace, Newcastle.
F. C. Marshall, Percy Gardens, Tynemouth.
J. C. Ridley, Summerhill Grove, Newcastle.
J. R. Simon, Hedgefield House, Haydon.
P. G. B. Westmacott, Benwell Hill, Newcastle.
Lindsey Wood, Southill, Chester-le-Street.
Thomas Wrightson, Norton Hall, Stockton-on-Tees.
T. W. Bunning, Clifton Road, Newcastle.
F. R. Goddard, 13, Victoria Square, Newcastle.
Thomas Bell, 23, Windsor Terrace, Newcastle.
J. Priestman, Queen Street, Newcastle.
R. Urwin, Sherburn Villa, Jesmond, Newcastle.
Ald. W. H. Stephenson (Sheriff of Newcastle), Elswick House, Newcastle.
Ald. C. F. Hamond, Lovaine Place, Newcastle.
Ald. G. S. Smith, 1, Abbotsford Terrace, Newcastle.
Ald. T. Wilson, Oaklands, Riding Mill.
T. B. Winter, 3, Brandling Park, Newcastle.
W. Wilson, Lovaine Place, Newcastle.
W. H. Willins, Blackett Street, Newcastle.
John Pattinson, 75, Side, Newcastle.
Professor Garnett, Mining Institute, Newcastle.
Charles Mitchell, Jesmond Towers, Newcastle.
Henry Charlton, Millfield Terrace, Gateshead.

BRITISH COMMISSIONER FOR COLONIAL AND FOREIGN EXHIBITS.

Warrington W. Smythe, F.R.S., 5, Inverness Terrace, London.

HON. SECRETARY.

John H. Amos, 10, Osborne Avenue, Newcastle.

HON. TREASURER.

J. J. Pace, 7, Bellegrove Terrace, Newcastle.

BANKERS.

Hodgkin, Barnett, Pease, Spence, and Co., St. Nicholas' Square, Newcastle.

SOLICITORS.

Does and Thompson, Pilgrim Street, Newcastle.

EXECUTIVE ADVISER.

Sir Somers Vine, 96, London Wall, London.

GENERAL SUPERINTENDENT.

Vernon Welch, South Kensington, London.

PROFESSIONAL ACCOUNTANTS AND AUDITORS.

J. G. Benson, 4, Haldane Terrace, Newcastle.

J. M. Winter, 18, Percy Gardens, Tynemouth.

ENGINEER.

Henry Carrick, Gateshead.

SECRETARY.

C. Kenrick Gibbons.

CASHIER.

William Kane.

But what of a site for the projected building? The public eye was carried intuitively to the Town Moor; and the wishes of the Executive Council in this direction were generously met by the Town Moor Management Committee and the Stewards of the Freemen. At a meeting of the former body, on the 21st of April, 1886, an application was submitted from Lord Ravensworth and the Mayor, asking for the use of the Bull Park for the purpose of the Exhibition; and, accompanied by a hearty expression of sympathy with the project, the request was at once complied with. On the 30th of the same month, the whole of the Divisional and Sectional Committees met under the presidency of Mr. Daglish; and on that occasion plans of the proposed building were presented by Mr. Wm. Glover, architect and vice-president of the Northern Architectural Association. They were adopted in the rough, but it was not until the 2nd of September, after consultation with Mr. Wilson Bennison, surveyor, of London, the plans, with certain modifications, were finally passed. With the growing requirements of the project, coupled with those of the show of the Royal Agricultural Society, also to be held in Newcastle this year, an application for a further grant of ground became necessary; and this, too, was cheerfully conceded, the total area ultimately set apart for the two undertakings being about 3½ acres. Although tenders for the erection of the building were received from London, Liverpool, Edinburgh, and Newcastle, the contract was eventually let to Mr. Walter Scott, of the last-named city. This, at a time when much distress through want of employment prevailed in the district, was hailed as a welcome consummation. The formalities connected with the sealing of the contract were concluded on the 20th of September, and within a day or two of that date, active operations were commenced. The work throughout went bravely on; and on the 28th of February last, the building, practically complete in all its details, was formally taken possession of by the Executive Council. With the result, the promoters of the Exhibition and the public had every reason to be satisfied.

DESCRIPTION OF THE BUILDING.

The plan followed in the erection of the building in which the Exhibition is held is that carried out in the case of the late exhibitions at South Kensington. The structure is composed chiefly of wood, covered with oilcloth, although in some cases corrugated iron sheets have been employed; and the day-lighting is supplied by large skylights inserted in the roof. The building is quadrangular in form, the four courts, or series of courts, into which it is arranged being termed, North, West, South, and East. The first of these is so called as being the most northerly portion of the range; the second forms the western extremity; the third is on the side nearest to the city; while the fourth is on a line parallel with the North Road, and looks towards the East. The building presents a frontage of considerable length, immediately opposite to the Brandling Park. Here is situated the main entrance, which consists of three arcades, that in the centre bearing on the top a statue emblematic of Britannia, while a small tower surmounts each of the sides. Between the doorway and the turnstiles there has been reserved a large area, by which it is expected that the discomforts of crushing and crowding will be avoided; and at its western extremity has been erected a high screen, which will serve as a barrier and as a preventive against the introduction of dust and draughts into the building. In this area, too, there has been provided, on the right hand, a money-change office, only the exact amount of entrance money being received at the turnstiles. These barriers passed, the visitor finds himself in the building, and at the threshold it will be seen that the public convenience and comfort have been fully provided for. On the north or right hand side are placed the cashier's and other offices, while on the south or left hand side are arranged the offices of the secretary, council room, and Post-Office. Very near the entrance, too, on the

right, is a "Left Parcels Office," where luggage can be deposited for a small payment; and still further in the same direction has been provided a cloak-room and lavatory for ladies. Similar conveniences have been supplied both for ladies and gentlemen at other divisions of the building. In a survey of the building and its contents, the course which most naturally suggests itself is that of a commencement with the North Courts, extending from east to west a distance of 430 feet. Each of these courts is 50 feet in breadth, and the height of the central one is 35 feet, and that of the two side ones 30 feet. Beyond these two courts are two lean-to, each of which is 20 feet wide, so that the total width of the whole of these courts is 190 feet. From this point, the visitor is guided into the West Courts, of which the more westerly, called the Western Annexe, is 635 feet long by 45 feet broad, and 28 feet 6 inches high; the dimensions of its neighbour being 436 feet long by 90 feet broad, and 30 feet high. From the south end of the West Courts, the South Court is entered. This section of the building consists of a central span and a lean-to, the total length being 380 feet and the width 70 feet. In passing along this court, in an easterly direction, the visitor will find on his right hand the entrance to the dining rooms, consisting of three compartments, two of which are 121 feet long by 35 $\frac{1}{2}$ feet wide. Further along, on the same side, is the entrance to the art galleries, which are composed of two lines of three rooms each, making a total length of 280 feet, by a width of 30 feet; and at the eastern extremity of the court will be seen the exit leading to the theatre, in which accommodation has been provided for 1,500 persons, and of which Messrs. Howard and Wyndham, of the Theatre Royal Newcastle, are the lessees. This section of the building may also be entered from the North Road, affording admission to those who may not desire to avail themselves of the communication with the Exhibition. The East Court, the northern end of which leads once more to the main doorway, has a total length of 386 feet. The width across the main portion is 50 feet, and there are two lean-to of 20 feet each, making the total width 90 feet. What is known as the Inner Garden is the open space surrounded by the quadrangular range of buildings, around which is placed a verandah, with forms underneath, intended to shelter visitors from the effects of unpleasant weather. The North Gardens, which are much more extensive, and on which are erected the numerous external buildings, including the coal mine, lead mine, and Old Tyne Bridge, are those entered from various doorways on the north side of the North Courts. The gardens have been tastefully laid out and arranged; and among the many attractions which they offer will be embraced those of daily band performances. The Exhibition building was erected under the supervision of a special committee, of which Mr. W. Cochrane was chairman. Although it cannot yet be definitely stated, the cost of the structure is estimated at about £27,000; but as it is understood that the receipts from exhibitors and several other sources have been equal to that amount, the Exhibition may be said to have been opened free from debt.

FORMER EXHIBITIONS.

Exhibitions hitherto held in Newcastle have been devoted, almost exclusively, to the Fine Arts. The first undertaking of the kind was that which was opened in 1822 in the rooms of Thomas Miles Richardson—"Old T. M." as he was familiarly called—in Brunswick Place. The committee was composed of such men as Thomas and Robert Bewick, H. P. Parker, and Joseph Crawhall.

Other displays of a like character followed from time to time, but the first exhibition which most closely resembled the one now before the public was that locally known as the Polytechnic, and which was opened on the 6th of April, 1840, for the benefit of the Mechanics' Institute of Newcastle and Gateshead and of the North of England Fine Arts Society. The exhibition, which was on a very extensive scale, was entered by the Academy of Arts, Blackett Street, where a number of beautiful paintings were exhibited. The Joiners' Hall,

entered from the last-named apartment, was fitted up for the exhibition of a large microscope and other optical instruments. Returning into the Academy, the visitor entered a temporary gallery thrown across High Friar Street, and connecting the rooms in Blackett Street with those in Grainger Street. In this gallery were arranged a number of water-colour drawings; and several glass cases around the walls contained a variety of antiquities and curious works of art. In the Victoria Room, which succeeded, the articles displayed were numerous and exceedingly attractive; but Mr. Orde's racing trophies won by Beeswing, a marvellous collection of English manufactures in porcelain, bronze, steel, silver, and glass, a series of beautiful coats of mail, and a great variety of ornithological specimens by Mr. Hancock were among the most important exhibita. Connected with the Victoria Room were a refreshment room and two other small apartments containing curiosities; while on the opposite side a short staircase led to the Music Hall, which was occupied chiefly by machinery and manufactures, and to which the continual movement of so many engines imparted great animation. Descending the stairs of the Music Hall, another room of smaller dimensions contained a glass-blower, an organ, and a quantity of miscellaneous contributions; and, lastly, another room on the same staircase was devoted to the delivery of lectures. This wonderful and interesting collection had been principally contributed by the neighbouring nobility and gentry and by tradesmen of the town. The exhibition was at first opened for thirteen weeks, the season tickets for which were sold at 2s. 6d. each, and of these 8,268 were disposed of. Of single admissions at 1d. each 7,285 were recorded, and there were besides 2,713 admissions to soirees. At the end of three months, the exhibition was re-opened for a further period of seven weeks, during which 1,078 season tickets at 1s. 6d. were sold; 3,402 persons admitted to soirees; and 23,963 single admissions, besides 3,479 children at a lower price. Altogether, the visits made by season ticket holders and others numbered 236,323. This brilliant exhibition was finally closed by a soiree on the 2nd of September, when the total receipts were found to have been £4,458 15s. 1d., leaving a clear surplus for the benefit of the three institutions on whose behalf it had been promoted of upwards of £1,500.

A similar exhibition, in the interests of the Natural History and Fine Arts Societies, was opened by a soiree and promenade on April 24th, 1848. The arrangements were almost exactly the same as those made for the exhibition of 1840; and the collection of works of art and manufacture was quite as valuable and interesting as on that occasion. The newly-invented hydraulic engine of Mr., now Sir W. G. Armstrong was used instead of a steam-engine as the motive power of the machinery, and novelty attracted much attention, the event having been commemorated in local poetry and song by the late Mr. Thos. Wilson, the author of the "The Pitman's Pay," and Mr. J. P. Robson. The Lecture Room in Nelson Street was also appropriated to the exhibition, and contained a colossal organ, by Nicholson, and a large microscope. The exhibition closed on the 2nd of October, when there had been 101,518 single admissions; 3,446 admissions to soirees; and 6,928 school children, &c.; whilst the sale of season tickets had reached 3,449. The undertaking, however, from a pecuniary point of view, was not so successful as its predecessor, the net profits not having exceeded £150.

The next local exhibition of note was that promoted on behalf of the Newcastle Mechanics' Institution, and which was opened by Earl Grey, then Lord-Lieutenant of the county, in the Town Hall on the 19th September, 1866. Although, like many of those which had gone before, this exhibition consisted mainly of pictures, there were also associated with it a number of miscellaneous works. It remained open until the 13th of October, and the result was altogether of a very gratifying character. Indeed, little doubt was entertained that, if it could have been extended in duration, the art collection would have enjoyed increased popularity, for on the closing evening the scene in the Town Hall was busier than ever. The admissions at the reduced scale of 6d each reached 2,721,

being 500 in advance of any previous day. But this did not represent the total attendance, there being also the holders of season tickets, who formed no inconsiderable portion of the general throng. The total receipts up to and including the closing day amounted to upwards of £900. The expenses were estimated at the outset at something like £400, but as the exhibition proceeded it was found necessary to incur additional expenses in the musical department and for advertising, which raised the amount to above £500, leaving a surplus of upwards of £400 to be devoted to the building and furnishing fund of the new Mechanics' Institution.

On a still more extensive scale, and much more nearly akin to the exhibition about to be opened on the Town Moor, was the North-East Coast Exhibition of Naval Architecture, &c., held in the Aquarium at Tynemouth during the month of September and part of October in 1832. Although not directly connected with Newcastle, this undertaking numbered among its promoters and managers many manufacturers and others connected with that town; and much of the success which attended it was attributable to that source. The address, at the opening ceremony, was delivered by the Earl of Ravensworth, who had taken an active part in the preliminary arrangements and subsequent management. The total attendance from beginning to end exceeded 250,000; and the financial result, submitted to a meeting of the Executive Committee on the 8th of October, showed a balance available for distribution of a little over £1,100. It was decided that £750 of that amount should be invested in trustees to form the nucleus of a fund for the endowment of a chair of engineering and naval architecture, or scholarships, in connexion with the College of Science in Newcastle-upon-Tyne. The balance was distributed, in fixed proportions, among several philanthropic institutions having for their object the safety and protection of the seafaring community.

THE OLD TYNE BRIDGE.

Few objects outside the Exhibition building promise to be more attractive than the *fac-simile* of the Old Tyne Bridge, as it stood before the flood of 1771, and which has been erected across the ornamental lake in the North Gardens. In this work, which has been carried out under the direction of Mr. P. J. Messent, engineer to the Tyne Improvement Commissioners, a wonderfully exact reproduction of the original has been aimed at and achieved; and a touch of the realistic has been imparted by the insertion in its corresponding position of the actual "blue stone," which divided the jurisdiction of Newcastle from that of Gateshead, and which has been lent by Ald. Cail. The visitor has to imagine that the portion of the structure next to the Exhibition building represents the Gateshead end, while that facing the North stands for the Newcastle end.

In its general outline, the peculiar-looking structure thus reproduced was well described in a paper by Mr. James Clephan, read some time ago at a meeting of the Newcastle Society of Antiquaries. Tier upon tier of windows rose from roof. Houses and marts encroached on the narrow thoroughfare on the one hand, [hung over the tide on the other, in rival endeavour to accommodate their inmates and customers. Another writer remarks that the bridge, with its lofty houses and shops built on each side, gave it so much the appearance of a common street that a stranger scarcely knew that he was crossing a river till he discovered it by an opening near the middle, just over the draw-bridge. On the bridge there appear to have been three towers, viz., the Gateshead Tower, on the south side: the Prison House, near the middle; and the Magazine Tower, near the Guildhall, on the Newcastle side. In connexion with one of these towers, a humorous incident is related in the "Memoirs of Ambrose Barnes." "One Harry Wallis, a master shipwright, was," says the narrative, "so abusive with his tongue, that Ald. Barnes was provoked to commit him to the Tower on the Bridge.

His hands being idle, they were ripe for mischief; and finding a quantity of mault lying in the chamber where he was lodged; and the chamber standing over the river of the town, he takes a shovel and throws it all into the water out at the window, morally reflecting upon himself and saying,

Oh base mault,
Thou didst the fault,
And into the Tyne thou shalt,

to show what virtue good ale has to inspire another Hudibras." Among the shops in the old thoroughfare was that of Martin Bryson, who carried on the business of a bookseller near the Newcastle end, and on the side of the Close. His friend and correspondent, Allan Ramsay, the author of the "Gentle Shepherd," once posted in Edinburgh a letter bearing the following address:—

To Martin Bryson on Tyne Brig,
An upright, downright honest Whig;

and the epistle duly reached the man for whom it was intended, in the shop on the bridge. Reporting on the state of the structure in October, 1769, Smeaton, the eminent marine engineer of that day, said he had found the first arch beginning from the south side needing, apparently, no material repair. It was, however, in great measure blocked up by cellars for the convenience of the houses above, and had no current of water through it when the low water was below the "sterlings" or "jetees," as they were called, which surrounded all the piers in the manner of London Bridge.

The old bridge so reported on, and which had stood from about the year 1250, was overtaken, on the 17th November, 1771, by a disaster which practically resulted in its total destruction. On that day there swept over the district a flood, which was so rapid and sudden in its incursion that it was with the greatest difficulty the inhabitants of Newcastle who slept in the lower parts of the houses escaped with their lives. The middle arch of Tyne Bridge and two other arches near to Gateshead were carried away; while seven houses with shops standing upon them, with some of the inhabitants, were overwhelmed in immediate destruction. Mr. Fiddes, who lived on the north end of the bridge, with his wife and maid-servant, having made their escape to Gateshead, the girl recollecting a bundle which she left behind, begged her master she might go back for it, and that he would be so kind as to accompany her—a request with which, after some hesitation, he complied, and his wife stood watching their return; but in a moment after their separation the arch under them gave way, when they vanished from her view, and she never saw them more. Mr. Fiddes and his maid, Ann Tinkler, Mr. Christopher Byerley, and his son, together with an apprentice to Mr. James, were the persons who perished by the falling of these arches. Four other houses, with shops, fell from the bridge the next day into the river; and in a little time, the whole range of buildings, from near the "blue stone" into Gateshead, met with the same fate. Mr. Patten's house was carried wholly as far as Jarrow Slake, where it was stopped; but on the inside being examined, nothing was found in it but a dog and a cat, both of which were alive. The preservation of Mr. Peter Weatherley, a shoemaker, with his family, who lived on the bridge at the time the arches fell, was very remarkable. Between three and four o'clock that morning he was suddenly awakened by the noise of the flood, and on opening a window he observed Mr. and Mrs. Fiddes, two children and their maid passing along the bridge. On shutting the window again, he was about repairing to rest, when, all of a sudden, the arch immediately adjoining his house, on the north side, rushed down. This instantly drew his attention to the safety of the family, and raising them up, he opened the door, when he beheld the destructive torrent rolling almost immediately beneath him. He then, with difficulty, quitted the house, and at the utmost hazard of his life (the pavement breaking and tumbling beneath his feet into the water) he assisted his wife, two children, and a

servant girl to follow him. As all access to the north was cut off by the falling of the arch, they immediately hastened to the south end, but had not gone far until they perceived themselves involved in still greater misery and danger, two other arches having likewise fallen at that part. In this distressful situation they remained from four till ten o'clock in the morning, perishing with cold, and presenting a most melancholy spectacle to the inhabitants on both sides of the water. Their station was upon a surface about six feet square, all other parts of the arch which supported them appearing terribly rent, and threatening each moment to bury them in the flood. None dared attempt to relieve them by boats, and no other human means seemed possible. At length, a bricklayer in Gateshead, named George Woodward, devised a plan for their rescue, and boldly ventured to execute it. A range of shops then standing on the east side of the bridge, supported only by timber, laid from pier to pier, and extending from Gateshead to the place where the distressed people stood, afforded him the means of saving their lives. He broke a large hole through the side of every shop all the way to the arch where they were, and through these openings brought the whole family safe into Gateshead. The children, when rescued, were nearly exhausted with cold.

The bridge thus destroyed, and which is believed to have been built chiefly of timber, was replaced by one of stone, which was completed in 1779. This, in its turn, proved inadequate for its purpose and the extended navigable properties of the river; and it was succeeded by the present Swing Bridge, which is of iron, and which was opened in 1876.

POPULAR INTEREST.

It was not until about half-past nine o'clock that there was any perceptible difference in the appearance of Neville Street. At that time excursion trains seemed to follow each other quickly, and the streets near the Station were soon crowded with people hurrying off in different directions. The bright sunshine and clear sky of the early morning had, unfortunately, given place to threatening clouds, drizzling rain, and a really sombre outlook. Trains, however, steamed into the station in rapid succession, and gradually Neville Street began to fill, until at half-past ten people were clustering thickly against the barricades, and the wide thoroughfare presented a busy and lively appearance. The mounted police had arrived; the police band also put in an appearance; the boys, active and agile as cats, were climbing on to all sorts of dangerous positions—the more dangerous the more they were striven for apparently, and the rapidity with which the crowd increased in density every minute was marvellous. At eleven o'clock, the bells of St. Nicholas's rang out cheerily, and the drizzling rain that had for some time fallen ceased. The crowd on the south side of Neville Street extended only to the entrance of the Station Hotel, a *cordon* of police keeping the flags clear to the Station gates.

ARRIVAL AND RECEPTION OF THE DUKE.

An hour before the time announced for the arrival of the special train conveying the Duke of Cambridge and suite, the streets in the vicinity of the station were crowded with eager spectators. Every position whence a view of his Royal Highness and the distinguished guests by whom he was accompanied, was occupied, and it was with the utmost difficulty that those fortunate enough to possess tickets of admission to the Central Railway Station forced a way through the crowd collected on the outer side of the barricades. Once inside the barricades, progress was comparatively easy. Upon reaching the main entrance to the station, a pretty sight met the eye. Along each side were arranged evergreens of every description, whilst attached to the pillars were spears upon which were small bannerettes. Reaching the interior of the station, flags and bannerettes were displayed in every quarter, and above the entrance to the

main platform a board covered with crimson cloth had been erected. Upon this board, which extended from one end of the gate to the other, there were the Newcastle arms and the Newcastle and Berwick-upon-Tweed coat of arms, and upon the platform side, the Royal arms, representations of the old Castle and Sir Wm. Armstrong's shield. Above this were suspended bannerettes, &c., similar to those which adorned the other parts of the station at this point, and still higher the words "Welcome to Newcastle." The right of the interior of the space barricaded off was occupied by a guard of honour, consisting of sixty men of the Northumberland Fusiliers, under the command of Lieuts. Neville and Oldfield. On the other side, and at different parts of the platform, were a force of railway policemen, under the command of Supt. Darrell. At the time stated there were not many people in the station, but as the ordinary trains from the district arrived many of the passengers lingered, and the number gradually increased. The first representatives of the Corporation to arrive were the mace and sword bearers. They were quickly followed by the Mayor in Court dress, accompanied by Alderman Smith. His Worship wore the new robe of office and the Mayor's chain. The Under-Sheriff of Newcastle (Mr. Atkinson) was the next to put in an appearance, and he was followed by the Sheriff (Ald. Stephenson) in Court dress, with robe and chain of office. The latter was accompanied by Mrs. Stephenson, who carried a beautiful bouquet of flowers. Amongst the other representatives of the Corporation who assembled subsequently were:—Ald. C. F. Hamond, as Deputy-Lieutenant of the City and County of Newcastle; Aldermen T. Wilson, H. Milvain, H. W. Newton, C. S. Smith, T. P. Barkas, Councillors J. Gibson Youll, T. Richardson, W. D. Stephens, R. H. Holmes, T. Temple, W. Temple, Robert Johnson, John Cutler, John Dobson, J. H. Ingledean, and W. M. Henzell. These gentlemen took their stand on the platform, and were at a later stage each provided with a white wand. The beauty of the scene was enhanced as military officers in their various uniforms arrived. Amongst those present were:—General Daniell, commanding Northern District, York; General Sir H. Havelock-Allan, Col. Smith, R.A., Col. Rowlands, Col. Taylor, commanding Royal Artillery, Northern District; Col. Potter, Col. Featherstone, Commander Alleyne, Major Olivant, R.A., Major Cope Collis, Assistant Quartermaster-General; Lieut.-Col. Le Mottee, R.A., Lieut.-Col. Downing, and Capt. Jefferson, of 3rd Volunteer Battalion Northumberland Fusiliers; Lord Charles Vane Tempest, Sir G. Elliot, Bart., M.P., Mr. Tennant, Mr. Alfred Harrison, and Mr. J. S. Mitford, of North-Eastern Railway Company.

Everything was in readiness for receiving his Royal Highness and suite fully half an hour before the train was timed to arrive. At a quarter-past eleven—punctual to the minute—the train came in view at the south end of the station. The spectators were quickly arranged at different points of the platform and entrances to the platform. The members of the Corporation and military officers drew up in lines reaching from each side gate to the edge of the platform. The train steamed into the station, and as the saloon carriage in which his Royal Highness and General Bates, General Freemantle, and Colonel Fitzgeorge were seated, approached those on the platform, his Royal Highness raised his hat repeatedly in response to a similar salute from those congregated to receive him. Matters were so arranged that the carriage came to a standstill immediately opposite the platform entrance. The officers named were the first to step on the platform. His Royal Highness followed, and was met at the door by the Mayor, with whom he shook hands. His Worship then formally presented his Royal Highness to the rest of those assembled.

In another saloon carriage were Sir W. G. Armstrong, Lady Armstrong, the Bishop of Newcastle, Mrs. Wilberforce, Captain Noble, and others. After a lapse of a few minutes, a move was made for the carriages in waiting in the portico. The representatives of the Corporation came first, then the ladies who had come by the special train, next the mace-bearers, and the Mayor and Sheriff. After these came his Royal Highness, the military officers, and, lastly, the remainder of those

who had travelled by the train. As the latter part of the distinguished company passed in front of the guard of honour, the band of the Northumberland Fusiliers played the National Anthem in a stirring manner.

The Marquis of Londonderry, Viceroy of Ireland, in company with Mr. Apperley, his private secretary, left Dublin at seven o'clock on Tuesday night, and arrived in Newcastle at 11:30 yesterday morning. His lordship was met on the platform by Lord Herbert and Lord Henry Vane Tempest. They proceeded to the Station Hotel, where he dressed himself in uniform, as commander of his regiment, and next drove in an open brougham to the Exhibition, accompanied by two mounted officers.

OUTSIDE THE STATION.

Notwithstanding that there was a slight shower of rain shortly after nine o'clock, which had the effect of calling umbrellas into requisition, a crowd of people began to take up their positions outside the cordon which had been erected along Neville Street, and extending to the portico of the Central Station, and by half-past ten it was very difficult for anyone to wend his way along the footpaths owing to the large number of people closely massed together. Fortunately, however, the rain soon cleared away, and as the time approached for the arrival of the Royal visitor, the crowd of people assembled at this point of the route assumed very large proportions indeed. In addition to those congregated outside, people were closely packed together at all the windows commanding a view of the procession, whilst spectators were also to be seen perched on the roofs of the Central Station, the County Hotel, the Tyne Commissioners' Offices, and other public buildings. Indeed, every conceivable point from which a view could be obtained had been appropriated. The centre of the road was, of course, kept clear by a staff of policemen, but their duties were anything but onerous, as the best of temper and decorum was maintained by the onlookers, none of whom attempted to transgress the rules which had been laid down for the due carrying out of the programme of the proceedings. Flags were displayed from the roof of the portico, or cab shed, of the Central Station, the County and Douglas Hotels, and other public buildings; but after all the display of bunting was anything but profuse. Capt. Nicholls and twenty mounted policemen were early astir; and at a quarter to eleven the duke's barouche, drawn by four grey horses, and two postilions, took up their position at the exit from the Central Station; and they were followed shortly afterwards by 35 men of the Northumberland Yeomanry Cavalry, under the charge of Major J. C. Straker and Lieut. T. W. Barker, the horses and their riders being drawn up in line with their heads facing the entrance to the station.

PROCESSION THROUGH THE CITY.

The first note of warning of the arrival of the royal visitor was sounded at about 20 minutes past 11, when the attendants on the bearer of the sword and mace heralded the approach of the duke by sound of trumpet. Shortly afterwards, the Reception Committee, headed by Messrs. W. D. Stephens and T. Richardson emerged from the station, and took their seats in the five open carriages outside the portico. The procession, which was in the following order, then moved on towards Collingwood Street:—

The Chief Constable.
Mounted Police.
The Constabulary Band.
Carriages containing
Members of the Reception Committee.
Carriage containing
The Sword and Mace Bearers and Trumpeters.
Carriage containing
The Sheriff and Mrs. Stephenson, and the Town Clerk,
and the Under Sheriff.
Carriage containing
The Mayor and the Mayoress, and Miss Browne.
Escort of Northumberland Hussars.

Carriage containing
His Royal Highness the Duke of Cambridge, K.G.
Escort of Northumberland Hussars.
Carriages containing
The Suite of His Royal Highness.
Carriage containing
Sir William and Lady Armstrong and Visitors.
Military Officers.
Mounted Police.

When the Duke emerged from the station, and, along with his friends, took his seat in his carriage, he was greeted with a cheer, which he acknowledged by lifting his hat. The cheering continued at intervals as the procession moved down Neville Street, along Collingwood Street, and into Mosley Street, but as soon as it passed, the crowds of people quietly dispersed.

The procession turned from Mosley Street into Grey Street at 11:25. The decorations of the various buildings were pretty, but in no instance could they be described as elaborate. The crowd lined both sides of the thoroughfare. Spectators had, as usual on such occasions, struggled to get the best possible view, and as the carriage of his Royal Highness passed the Duke was at once recognised and saluted with the raising of hats and waving of handkerchiefs, and with occasional cheers. To these tokens of loyalty his Royal Highness repeatedly bowed his acknowledgments. When the procession reached the Monument the scene was much more animated, and the crowd of sightseers was very much swollen. It is scarcely possible to notice where the crowds were densest, or where the decorations were most extensive, but the portion of Blackett Street where the procession had to pass through, together with the corner of Northumberland Street, attracted much attention, as the inhabitants of this locality had certainly not been lacking in their efforts to render this part of the route worthy of the occasion, as flags and banners waved from nearly every window, presenting a very pleasing spectacle. The many thousands of people who had selected the vicinity of Northumberland Street as one of the most fitting places for sight-seeing had been probably well advised, for the uphill nature of this thoroughfare afforded a long and uninterrupted view of the procession. As the carriage containing the duke came alongside, the people cheered loudly, and the greeting was cordially acknowledged. Throughout the whole line of the thoroughfare, the utmost order was observed, and on every hand good humour was the prevailing characteristic. Boys, who were fully cognisant of the fact that it would be useless to crane their necks in the vast multitude to get a view of the proceedings, climbed several of the public lamps, and also appeared on the roofs of houses and other lofty positions, determined not to lose a tittle of the spectacle. According to the regulations set forth in the official programme, all vehicular traffic was stopped at eleven o'clock, and shortly after this time the people assembled in such immense numbers that they were several rows deep, and the pavement at this period of the day was almost impassable. The windows on either side of the street were literally crowded with faces, and the balconies connected with the several business places were crammed to their fullest capacity. Precisely at twenty-five minutes past eleven, when the Duke and his suite were observed approaching into Blackett Street, they were hailed with enthusiastic shouts, which were taken up by the crowd beyond, and kept up for some time. His Royal Highness continuously acknowledged the compliments paid to him. The mounted police made their patrols for the purpose of keeping back the crowd, and this was good-naturedly performed, and the exceptionally large gatherings in Blackett Street and Northumberland Street were kept in admirable order while the procession passed.

The Barras Bridge perhaps presented the most attractive scene in the whole route of the procession. Here the trees surrounding St. Thomas's Church, the Museum, and in front of the large houses at the end of Jesmond Road appeared gay in their spring foliage, and the light green tints contrasted beautifully with the gay colours of the "Union Jacks" and other flags that were ranged on either side of the road. Large crowds had taken up positions on both sides of the road.

The front of the church railings, and the large footpath spaces at the end of Jesmond Road and in front of the Museum, were literally packed with people, while every window, the tops of some of the houses, and many of the trees were occupied by sight-seers. The cabman's shelter opposite the church showed a display of bunting, and on its roof a stuffed figure of a cabman had been placed, which attracted some attention, and caused no small amount of merriment. In one of the private gardens at the end of Jesmond Road an enterprising photographer had taken up his stand ready to "take" the procession as it passed the church. All the way up the line a wide space was kept clear by a numerous staff of policemen, who religiously excluded all those who were not furnished with the necessary tickets for traffic. As the procession passed the church, cheers were given for his Royal Highness, and the cheering was continued right up to the barricade at the end of the Exhibition buildings. The Duke repeatedly bowed in acknowledgment to the welcome tendered him. It may be mentioned that at this point of the route an ambulance corps of the 1st Northumberland Artillery Volunteers, under the charge of Dr. Baumgartner, was stationed near the Museum. When the procession had passed the Museum, the carriages and policemen were followed by a dense mass of people, and in a short space of time the thoroughfare was blocked up. Hundreds of persons then turned into the Museum, where the art treasures, &c., were viewed with interest.

ARRIVAL AT THE EXHIBITION.

Behind the strong barricades erected on the eastern side of the North Road, outside the Exhibition buildings, were closely packed a large number of people of both sexes. The side of the road near the Exhibition had been cleared of foot passengers more than half an hour previous to the arrival of the procession, and it was with considerable reluctance—in many cases this feeling was accompanied by wordy remonstrances against the action of the police—that the thousands of people who had taken up so advantageous a stand were prevailed upon to vacate their position. Along the right side of the turnpike, flags floated at intervals, and at the entrance to the Exhibition buildings there was also a display of bunting, but the attempt at decoration was not ostentatious. The crowd, uncomfortably crushed together as many of them had been here for a couple of hours, behaved admirably, and patiently awaited the coming of his Royal Highness and party. In the enclosure were a large number of policemen, and they firmly carried out their instructions to keep unprivileged persons "outside." At twelve minutes before the time announced for the arrival of the procession—twelve o'clock—the mounted police, who headed it, passed the entrance to the Exhibition, and in a few minutes more a hearty cheer announced the arrival of the Duke, and the demonstration of the crowd was immediately followed by a Royal salute fired by the Royal Artillery, stationed at a distance outside the Exhibition. The principal gentlemen who had taken part in the procession lined each side of the entrance to the Exhibition, and his Royal Highness, treading on a scarlet-coloured carpet, was received by his Grace the Duke of Northumberland and the Earl of Ravensworth. Drawn up in two lines opposite to the entrance road, the 3rd Battalion of the Northumberland Volunteer Fusiliers (under the command of Major Wilson), furnished a guard of honour, while the band of the regiment played the National Anthem when the carriage of the Duke came to a stand.

ARRIVAL OF THE DUKE OF CAMBRIDGE.

At a quarter to twelve o'clock, the sounding of a signal gun from the "Bleak Northumbrian Moor" announced to those inside that his Royal Highness the Duke of Cambridge, Commander-in-Chief

of the British Forces, had arrived in sight, on the North Road. A few minutes later, the band outside was heard playing the National Anthem, and the Duke of Northumberland and the Earl of Ravensworth took their places near the door to receive the Royal visitor. It was just five minutes before the hour when the doors were thrown open, and the first portion of the procession filed into the hall. First came the bearers of the city sword and mace, and behind them walked the Mayor and Sheriff of Newcastle, both in Court dress, and wearing their robes and chains of office. Behind came the Town Clerk and the Under-Sheriff, also in the Court velvet. Then came his Royal Highness the Duke of Cambridge, wearing his uniform as Commander-in-Chief, and carrying his cocked hat and plume under his left arm; and behind him walked the officers of his suite, all in uniform. Immediately upon the entrance of his Royal Highness the trumpeters gave forth a fanfare, and many of the spectators, in their anxiety to obtain a view of the initial proceedings, rose in their seats, but were promptly and imperatively admonished by those behind to "sit down!" His Royal Highness having advanced into the grand hall, the Chairman and members of the Executive Council and chief officials of the Exhibition were presented to him by Lord Ravensworth.

THE ADDRESS AND THE REPLY.

This having been done, the MAYOR, addressing his Royal Highness, said: May it please your Royal Highness: I ask your Royal Highness to receive an address from the Mayor and Corporation of Newcastle-upon-Tyne, and I will ask the Town Clerk to read it.

The TOWN CLERK (Mr. Hill Motum) then read the address, as follows:—

To His Royal Highness the Duke of Cambridge, K.G., &c., &c.

May it please your Royal Highness,
We, the Mayor, Aldermen, and Citizens of the City and
County of Newcastle-upon-Tyne, in Council assembled, respectfully
offer to your Royal Highness the cordial welcome of an ancient
Corporation.

We desire to renew the assurance of our devoted loyalty and attachment to Her Most Gracious Majesty the Queen, and to the Royal Family, of which your Royal Highness is so distinguished a member; and to express our warm feelings of gratification and pleasure that your Royal Highness, representing her Majesty, graciously honours Newcastle with a visit in this the Jubilee Year of her Majesty's most glorious reign, and associates an event so memorable in the history of our city, with the opening, on behalf of her Majesty, of the Newcastle Royal Mining, Engineering, and Industrial Exhibition—an undertaking in which we are deeply concerned, and which we sincerely believe will advance the interests of the large commercial and manufacturing district of which Newcastle is the centre.

We trust that your Royal Highness may long be spared to fulfil the duties of your exalted station; and we earnestly pray that the blessing of God may ever rest upon our gracious and beloved Queen, on your Royal Highness, and on the members of your Royal house.

Given under our Corporate Seal, this Twenty-ninth day of April, 1857.

BENJAMIN CHAPMAN BROWN, Mayor.

WILLIAM HASWELL STEPHENSON, Sheriff.

HILL MOTUM, Town Clerk.

The MAYOR, bowing, presented the address to the Duke of Cambridge, who, receiving it, bowed in return.

His ROYAL HIGHNESS then read the following reply:—
In behalf of the Queen, whom I have the honour to represent this day, I thank you for your loyal and dutiful address on the occasion of the opening of the admirable Exhibition which you have associated with the commemoration of the fiftieth year of her Majesty's reign. Her Majesty recognises with great satisfaction the loyalty and good feeling of this ancient corporation, and feels confident that the same zeal and energy which have organised this Exhibition, and have raised this city to its present high commercial importance, will always continue to animate their minds, to the future advancement of their wealth and prosperity. I am much gratified at the warm manner in which you have received me, and I offer you my best wishes for the success of this Exhibition and the welfare of the city and county of Newcastle-upon-Tyne.

PROCESSION IN THE HALL.

The procession in the Grand Hall was then formed, in the following order:—

State Trumpeters.	
Chief Constable of Newcastle-upon-Tyne, Capt. Ni cholais.	
SURVEYOR:	ENGINEER OF OLD TYNE BRIDGE:
Mr. Wilson Bennison.	Mr. P. J. Messent.
GENERAL SUPERINTENDENT:	ENGINEER:
Mr. Vernon Welch.	Mr. Henry Carrick.
AUDITORS:	Mr. J. M. Winter.
MR. J. G. Benson.	EXECUTIVE ADVISER:
SECRETARY:	Sir J. R. Somers Vine.
Mr. C. K. Gibbons.	SOLICITORS:
Mr. R. R. Dees.	Mr. T. W. Thompson.
HON. SECRETARY.	HON. TREASURER:
Mr. John H. Amos.	Mr. John J. Pace.
THE MEMBERS OF THE EXECUTIVE COUNCIL, walking three deep.	
Mr. William Boyd	Mr. T. W. Bunning
Mr. Henry Charlton	Mr. G. B. Forster
Mr. C. F. Hamond	Mr. W. G. Laws
Mr. J. Pattinson	Mr. J. Priestman
Mr. C. S. Smith	Mr. J. B. Simpson
Mr. P. G. Westmacott	Mr. Lindsay Wood
Mr. Thos. Wilson	Mr. T. B. Winter
	Mr. W. H. Willins.
CHAIRMAN OF ELECTRIC LIGHTING COMMITTEE:	
Professor Garnett, and Mrs. Garnett.	
CHAIRMAN OF BUILDING COMMITTEE:	
Mr. W. Cochrane, and Mrs. Cochrane.	
CHAIRMAN OF FINE ARTS SECTION:	
Mr. Charles Mitchell, and Mrs. Mitchell.	
CHAIRMAN OF EXECUTIVE COUNCIL:	
Mr. John Daglish, and Mrs. Daglish.	
The Right Rev. the Lord Bishop of Newcastle and Mrs. Wilberforce.	
Dr. Thomas Hodgkin. Colonel Rowland, C.R.	
The Right Hon. John Morley, M.P. Mr. James Craig, M.P.	
General Daniell. Sir George Elliot, Bart.	
Sir Charles M. Palmer, M.P., and Lady Palmer.	
Sir Joseph W. Pease, Bart., M.P., and Lady Pease.	
Sir Lowthian Bell, Bart. The High Sheriff of Northumberland	
(Mr. Ralph Atkinson).	
Mrs. W. H. Stephenson and Miss Stephenson.	
The Mayoress of Newcastle and Miss Browne.	
Sir William G. Armstrong, C.B., and Lady Armstrong.	
His Royal Highness	
THE DUKE OF CAMBRIDGE.	
The Duke of Northumberland. The Earl of Ravensworth.	
The Marquis of Londonderry. Lord Sudeley.	
General Bates, K.C.B. General Freemantle, C.B. Col. Fitz-George.	
Earl Percy. Sir Matthew White Ridley, Bart., M.P.	
Sir Frederick Abel, C.B.,	
Organizing Secretary of the Imperial Institute. Honorary Director of the Royal Agricultural Society of England.	
The Sword and Mace Bearers of the City.	
THE UNDER SHERIFF:	
Mr. John Atkinson.	
THE SHERIFF:	
Mr. W. H. Stephenson.	
THE MAYOR:	
Mr. B. C. Browne.	
THE TOWN CLERK:	
Mr. Hill Motum.	
THE DEPUTY-LIEUTENANT OF NEWCASTLE;	
Ald. C. F. Hamond.	
Aldermen and Councillors of the Corporation,	
walking three deep.	
Representatives of Foreign Powers.	
Police.	

Having been thus arranged, the procession moved towards the far end of the court, while the people who lined the route rose to their feet and cheered as it passed. During the progression towards the dais, the processional march from Gounod's "Reine de Saba" was played on the organ and sung by the choir.

Arriving in front of the orchestra, his Royal Highness

was conducted to the dais by the Duke of Northumberland and the Earl of Ravensworth, accompanied by his Excellency the Marquis of Londonderry, Lord Lieutenant of Ireland, Lord Sudeley, Earl Percy, Sir Matthew White Ridley, Bart., M.P., Sir Lowthian Bell, Bart., the High Sheriff of Northumberland (Col. Atkinson), General Freemantle, General Bates, Col. Fitz-George, General Daniells, Sir George Elliot, Bart., M.P., the Bishop of Newcastle and Mrs. Wilberforce, the Mayor and Mayoress of Newcastle, Sir Wm. G. Armstrong, C.B., and Lady Armstrong, the Right Hon. John Morley, M.P., Mr. Jas. Craig, M.P., Sir Charles Mark Palmer, Bart., M.P., and Lady Palmer, Sir Joseph W. Pease, Bart., M.P., and Lady Pease, the Sheriff of Newcastle and Mrs. Stephenson, Mr. John Daglish (chairman of Executive Council) and Mrs. Daglish, Mr. Charles Mitchell and Mrs. Mitchell, Mr. Wm. Cochrane and Mrs. Cochrane, Professor Garnett and Mrs. Garnett. The dais was a structure raised about two feet from the floor of the court, and immediately adjoined the orchestra. The dais was covered with red cloth, and a number of plants were placed round the sides. The Executive Council and the officials, together with the members of the Corporation and invited guests taking part in the procession, proceeded to the seats provided for them in front of the platform. The first two or three rows of seats were taken up by the members of the Executive Council, members of the Corporation, and the officials of the Exhibition. Among the latter were Sir John Somers Vine, Mr. Bennison, Mr. Vernon Welch, Mr. J. H. Amos, and Mr. C. Kerrick Gibbons. Every inch of clear space around the orchestra and as far as the entrance hall was crowded with spectators. Many favoured ones had obtained permission to climb upon the huge exhibits in the court, from which excellent views of the proceedings could be obtained. Seats were provided for most of the distinguished persons on the platform, his Royal Highness occupying a chair in the centre of the group. The visitors had all got into their places before the conclusion of the processional march.

INAUGURAL CEREMONY.

At the conclusion of Gounod's stirring composition, there was a few seconds' pause, and then the inaugural proceedings commenced by the singing to the Jubilee Ode, written for the occasion by Dr. Thomas Hodgkin, of this city, by the desire of the Executive Council. The public had already had an opportunity of reading and admiring Dr. Hodgkin's ode, but only a privileged few had heard or seen the music which had been written by Dr. Rea, city organist, at the desire of the Executive Council, and the performance of the ode was awaited with great interest. The voices numbered about 260, and there were 55 performers in the orchestra. Mr. J. H. Beers was the leader of the first violins, and Mr. Derbyshire of the second violins. Dr. Chambers officiated at the organ, and Dr. Rea conducted the performance of the ode. Both Dr. Chambers and Dr. Rea wore their robes. The ode was as follows:—

I.
Upon a bleak Northumbrian moor, Behold a palace raised. Behold it filled With all that fingers fashion dexterously, With all that strongest fibred brains have willed, When they like Nature's self have vowed to build Structures that shall for centuries endure.
How come these marvels hither? By what power Have all been gathered in the self-same hour?
Upon a bleak Northumbrian moor, Why should both East and West for ever pour The willing tribute of their golden store In ceaseless tide upon thy storm-swept shore, Oh, little island in the northern main?
Oh, little isle between two oceans' spray? Deep lies the answer. Endless is the chain That binds the far-off Ages with To-Day.
II.
Here, when the North-wind raved, The giant tree-ferns waved, We see them o'er the unimagined tracts of Time. Yet never eye beheld Those woodlands fair of Eld; No hand those tree-trunks felled, Scarred by the Summer's flash, silvery with Winter's rime.

For countless years the sun,
Through steaming vapours dun,
Beheld their growth renewed
In sylvan solitude !
While the green-mantled earth slept in her innocent prime.
Wave ! fronded forests ! wave !
Sink gradual to your grave
Beneath some nameless river's oozy bed.
Roll ! myriad ages ! roll !
So shall the treasure Coal
Be stored for some new Race, Creation's crown and head.

III.
But vain were Nature's store,
Vain as the golden ore
Upon some barren isle for famine-wearied men,
Unless her sons be true,
Mighty to dare and do,
And prompt to bind at need the social bond again.
Patience and mutual trust,
And courage to be just,
And the frank, fearless gaze that seeks its fellow's eyes,
And loving loyalty,
Law-bound, yet ever free—
Upon these deep-set stones enduring Empires rise.

IV.
Thus hath our England grown,
E'er since, long years ago,
She first did turn her face toward's Freedom's holy light,
When Alfred, best of kings,
Beat back the Raven's wings,
And gave her Law for War, sweet Day for barbarous Night,
Till now, when Alfred's child
Sees 'neath her sooty mild
Wide ocean-sundered realms in loyal love unite.

V.
Lady ! who through thy tears
Surveyest the traversed years,
The bright, the sad, the strange half-century,
The people's shouts acclaim
Thy loved victorious name :
Oh, be that name the pledge of conquests yet to be,
O'er Want and grinding Care,
Faction and fierce Despair,
Dark Ignorance in her lair,
And all that mars, this day, our joyous jubilee.

VI.
Lord of the ages ! Thine
Is the far-traced design
That blends Earth's mighty Past with her To-be.
Slowly the web unrolls,
And only wisest souls
Some curves of Thine enwoven cypher see.
Power fades and glory glides,
But the Unseen abides.
Thither lift Thou our hearts, and let them rest with Thee.

Dr. Rea's music, which we have already fully described, was finely rendered, and loud cheers were given at the conclusion of the ode. It was listened to with rapt attention throughout, and the reception it received must have been flattering alike to Dr. Hodgkin, Dr. Rea, and to those engaged in the performance.

As soon as the last notes of the Jubilee Ode had died away, the Earl of Ravensworth stepped to the front of the dais, and read an address of welcome to his Royal Highness on behalf of the Executive Council of the Exhibition. The address was as follows :—

To his Royal Highness the Duke of Cambridge, K.G., &c.

May it please your Royal Highness,
We, the Patron, President, Vice-Presidents, Executive Council, and Committees of the Newcastle-upon-Tyne Royal Mining, Engineering, and Industrial Exhibition (International and Colonial), in this Jubilee Year of the reign of her Most Gracious Majesty the Queen, desire to express our most grateful acknowledgments of the deep interest which her Majesty and your Royal Highness have been graciously pleased to take in our undertaking, and our warm feelings of gratification and pleasure that your Royal Highness, representing her Majesty, graciously honours us with this visit, and by performing, on behalf of her Majesty, the inaugural ceremony of to-day.

The undertaking which her Majesty and your Royal Highness have so honoured is one in which this district is deeply concerned, and to promote the success of which all classes of the community have spared no efforts.

The Exhibition is ready for your Royal Highness's inspection, and will be found to contain most important and valuable exhibits of the industries, manufactures, and products of this and other countries. The exhibits relating to mining are varied and extensive, and are especially interesting, including a complete full-sized working model of a coal mine. The Fine Art Galleries contain a

large and valuable loan collection of works of art, including two very generously lent by her Most Gracious Majesty the Queen. And there are among the rare and varied contents of the building many splendid and interesting objects selected from the possessions of her Majesty, and of his Royal Highness the Prince of Wales. The reproduction of the Old Tyne Bridge of the last century is also worthy of attention.

We believe that our undertaking will be productive of the most beneficial results in extending commercial industry and developing trade and manufacture, and we shall ever remember the kindness of her Majesty and your Royal Highness in assisting our efforts to attain these results.

We desire to tender our dutiful expression of devoted loyalty to her Most Gracious Majesty the Queen, and we earnestly pray that every blessing may attend your Royal Highness.

Dated this 11th day of May, 1887.

Lord RAVENSWORTH then presented to his Royal Highness splendidly bound copies of the official catalogue of the exhibits, and the official guide to the Exhibition.

His Grace the Duke of NORTHUMBERLAND then presented to his Royal Highness the gold master key. The key is splendidly finished, and of the highest class of workmanship. Its general form is of trefoil shape, being in the style of the later Gothic. It bears on the obverse side the arms, supporters and crest, and motto of the Newcastle Corporation, emblazoned in heraldic colours in enamel, resting on a bar or table, supported by two scrolls, on which are placed emblems of mining and navigation—the safety-lamp, pick-axe, anchor, &c. In a circular tablet below is the head of an ancient sea-god, the old Norse deity, with a background of blue enamel ; then comes a fluted column, varied at intervals by mouldings. On the reverse of the head of the key are placed the Royal Arms and supporters in enamel, indicating the Jubilee of her Majesty's reign ; other emblems appear below this of a military nature—the gun, cannon ball, &c.—relating to the trades of the district. V.R.L. in the reverse of the circular tablet, is the Royal and Imperial monogram, having due relation to the occasion of the Exhibition. The key was made by Messrs. Chubb and Sons, of London.

His Royal Highness, in responding, was greeted with loud cheers. He said :—Lord Ravensworth and gentlemen, it gives me great pleasure to be permitted to represent the Queen at the opening of this interesting Exhibition, and in her Majesty's behalf I am to thank you for your loyal and dutiful address. The Queen has never ceased to take a deep interest in all that concerns the welfare and happiness of her people ; and her Majesty equally recognises in the organisation of this Exhibition conspicuous evidence of the progress in engineering, and of industrial skill and science. It is impossible not to admire greatly the splendid collection of objects I see this day brought together to illustrate the manufacturing and mining industries of this and other countries. I earnestly trust the remarkable exhibits which relate to mining may serve to suggest further means for the protection of those who labour in collieries, as well as to assist in the development of that important branch of trade. I thank you for the cordial welcome with which you have received me. It has given me the greatest satisfaction, and I hope that the Exhibition may prove successful, and entirely fulfil the excellent object for which it has been designed. I declare this Exhibition opened. (Loud cheers.)

This declaration having been made, a flourish of trumpets by the Queen's trumpeters, who stood at the front of the platform, announced to the assembled thousands that the Newcastle Jubilee Exhibition had been formally opened.

The choir then struck up the Old Hundredth Psalm, the following two verses of which were sung.

All people that on earth do dwell,
Sing to the Lord with cheerful voice ;
Him serve with fear, His praise forth tell ;
Come ye before Him and rejoice.

For why ? the Lord our God is good,
His mercy is for ever sure.
His truth at all times firmly stood,
And shall from age to age endure.

In accordance with a request made upon the official programme, the audience joined in the singing of the second verse, the effect being very impressive.

The BISHOP of NEWCASTLE (Dr. Wilberforce) offered up a suitable prayer, and the opening ceremony then concluded with the singing of the National Anthem (Costa's arrangement).

A procession for the inspection of the grounds and buildings was then formed, as follows:—

The Hon. Secretary and the General Superintendent.

HIS ROYAL HIGHNESS

and Suite.

The Dukes of Northumberland and the Earl of Ravensworth.

The Party from Craggside and other distinguished Visitors,

Conducted by the Chairman of the Executive Council

and the Mayor of Newcastle.

The Executive Council and Officials.

The Members of the Corporation of Newcastle.

The Representatives of Foreign Powers.

Police.

During the procession round the Exhibition, the following programme of music was performed by the full orchestra and chorus:—

Hallelujah Chorus, from Beethoven's "Mount of Olives."

Hallelujah unto God's Almighty Son!

Praise the Lord, ye bright angelic choirs.

In holy songs of joy, Man, proclaim His grace and glory.

Hallelujah!

Selection from "The Creation," by Haydn. Soloists:—Soprano, Madame Tomsett; tenor, Mr. D. Macdonald, of Durham Cathedral; bass, Mr. J. Nutton, of Durham Cathedral.

Hallelujah Chorus from Handel's "Messiah."

Hallelujah: for the Lord Omnipotent reigneth.

The kingdom of this world has become the kingdom of Our Lord, and of his Christ; that he shall reign for ever and ever.

King of Kings, and Lord of Lords. Hallelujah!

VIEWING THE GROUNDS AND BUILDINGS.

The route pursued by the Royal party in inspecting the buildings and grounds was not quite that originally intended. The procession passed down the main aisle of the North Court and through the middle door into the outer gardens. His Royal Highness was first conducted over the Old Tyne Bridge, one of the main features of the outer grounds. He was much pleased with the structure, and examined the quaint erection in every detail. After examining the bridge the earthworks thrown up by the Newcastle Engineer Volunteers as well as the military bridges thrown by them across the lake engrossed the attention of the Commander-in-Chief and his suite for some time, his Royal Highness here also appearing very well satisfied with the part taken by the volunteers in the Newcastle Exhibition. Moving to the right, the party then proceeded down the main avenue of the Gardens, passing on the right the band stand and other erections, and on the left the model of Alnwick Castle, the Swiss Chalet, Lockhart's and Messrs. Gibson's refreshment rooms, &c. On reaching the bottom of the main avenue, the party passed along the outside of

the north verandah to the entrance to the coal mine; which the procession entered. Some time was spent here, his Royal Highness being deeply interested in the splendid model by which so accurate an idea of the general working of a colliery can be obtained. Emerging, the procession entered the lower door into the North Court, and crossing the main section, passed down the East Court, mainly devoted to the exhibition of furniture. Here the lavish fittings of the several of the stands in the main avenue were minutely inspected. The procession next passed out of the central door on the east side into the inner gardens, where Mr. Amer's band was playing a selection of music. The party passed along the square to the north-west corner by the door in which they again reached the North, or Main, Court. His Royal Highness had already, upon first entering the building, observed the unique collection of ordnance sent to the Exhibition by the famous Elswick firm of Sir W. G. Armstrong, Mitchell, and Co. The procession passed along the south aisle of the North Court, the beautiful engines by Messrs. Stephenson and Messrs. Black, Hawthorn, and Co. being regarded with interest. On reaching the top of the section, His Royal Highness and party turned into the West Court, and passed along the east aisle. The first exhibit in the court—that of Messrs. Bolckow, Vaughan, and Co., of Middlesbrough—engaged the attention of the party for some time. The heavy exhibits of Messrs. Harfield and Co., of Blaydon, and of Messrs. Walker, of Wigan, also arrested the progress of his Royal Highness. At the splendid stand of Mr. Andrew Reid, printer and lithographer, a halt of some minutes was made while the party examined the splendid collection of machinery got together on the stand. One of the Duke's *aides-de-camp* was struck with the machine on which the first issue of the *Chronicle* was being printed. One of the impressions was handed to him, with which he was much pleased, and said it should be handed to the Duke. Messrs. Tangye's and other largest stands in the court were also inspected with interest by his Royal Highness, and many queries were put to the Mayor with regard to their contents. Hurriedly passing through the South Court, the Commander-in-Chief was shown the Grace Darling Life-boat, the splendid collection of carriages got together by Messrs. Angus and Co., Messrs. Atkinson and Philipson, as well as other exhibits of importance. The great interest shown by his Royal Highness in the contents of the exhibition must have been extremely gratifying to the promoters of the exhibition and those who accompanied him in his tour. The party having entered the Art Gallery, off the South Court, the Duke of Cambridge appeared to be surprised at the splendid and unique collection of pictures which had been got together. Mr. Chas. Mitchell, the chairman of the Fine Art Section, was enabled to give his Royal Highness every information on the subject of the exhibits in this beautiful feature of the Exhibition. The Commander-in-Chief spent considerable time in each of the rooms, and inspected, with evident pleasure, the most notable productions hung on the walls. The party having inspected the pictures passed out of the art gallery and made their way to the main entrance, by which they left the building.

OUTSIDE EXHIBITS.

Messrs. John Fowler and Co., Leeds, through their representative, Messrs. Cockburn Brothers, St. Nicholas' Buildings, show a compound locomotive fitted with crane, the latter worked independently, and capable of lifting from three to five tons. They also show two of their improved compound semi-fixed engines, with patent automatic expansion gear, and a narrow gauge locomotive for light narrow gauge railways. The Steel Company of Scotland exhibit near the engine house a taking display of patterns of the large steel castings they produce by the Siemens process. In close proximity splendid specimens of the world-famed Newcastle grindstones are exposed to view by Messrs. Robert Patterson and Sons, Newcastle; Messrs. Jessop, of Sheffield, show models of the stern, frame, and rudder of a ship. Messrs. John Brown and Co., of Sheffield, heavy specialities, Messrs. Thwaites Brothers, Bradford, a large cupola, and Messrs. Teasdale Brothers, Bank Top Ironworks, Darlington, have an immense display of lead mining plant at the west side of the lake. Davis and Snaide, millstone makers, Liverpool, at this part show their produce. A kiosk to resemble mottled soap is erected in these grounds by Messrs. Crosfield; and Nestlé's Swiss Milk Company are represented by a fine chalet, near the military bridges. At the bottom end of the ground, Messrs. Isaac Dixon and Co. Windsor Ironworks, Liverpool, have built an iron cottage, similar to the cottages and churches supplied by the firm; Henderson's patent mechanical stoker and self-cleaning furnace is seen at this part, together with a coal shooting screen by Messrs. Joseph Cook and Son, Washington, Durham. At others parts of the grounds water-tight wood roofing is shown by Mr. Little; steel castings by Messrs. John Spencer and Sons, Newburn; hot houses, Messrs. Mackenzie and Moncur, Glasgow and Edinburgh; conservatory and heating appliances, Hardy and Co., Edinburgh; self-cleaning furnace, Redhead and Ingram, Sunderland; hot air stoves, &c., A. H. Smith, Bristol; wire work, W. E. Foggin and Co., Newcastle; model silver mines, E. Bone & Co., Gateshead; non-conducting papier-mâché, S. T. Taylor and Sons, Newcastle; gas cookers, &c., R. and A. Main, Glasgow; gas stoves, &c., Charles Wilson and Sons, Leeds; ventilators, Aeolus Waterspray and General Engineering Co., London; oven ranges, Walker and Sons, Newcastle; cooking stoves, &c., Arden Hill and Co., Birmingham; ovens, Crabtree Brothers, Leeds; petroleum engines, Sherlaw and Co., Birmingham, and Gill and Co., London; rock drills and machines, John Grey Cranston, Grey Street, Newcastle; stone-breakers, Askham Bros. and Wilson, Limited, Sheffield; brick refrigator, &c., T. E. G. Marley, Workington; coal tunnelling machine, Stanley Bros., Nuneaton; patent briquette machine, Yeadon and Co., Leeds; diamond boring machine, Aqueous Works and Diamond Boring Co., Limited, London; domestic labour-saving machines, F. and C. Hancock, Dudley, Worcestershire; knitting machines, J. Forster, Preston; patent air compressor, Day and English, Bath; Archer's patent stone breaker, Dunston Engine Works; helical pump, J. A. Wade, Hull; model hospital, per R. Bucknall, Newcastle; the studio of the London and Provincial Photographic Co. The Board of Trade show life-saving apparatus, and the Newcastle Corporation specimens of the town sewers.

Visitors, and especially those connected with building or manufacturing businesses, should not neglect before

leaving the North Ground to inspect the articles shown under the North Veranda. The builder has in reality been at work here, and many tasteful structures are to be seen. The following firms are represented:—Messrs. Brooke and Sons, Huddersfield, an excellent assortment of fancy tiles, &c. Messrs. Smith, Patterson, and Co., Blaydon, have a grand display of metal goods, railway chairs, piping, grating, &c., together with a specimen of the large cylinders which this firm are manufacturing, and which are being used in the new Thames Tunnel, being made for underground railway purposes. The firm of the Bourtresshill, Dieghorn, Coal Company, Limited, Kilmarnock, have a stand representative of baths, troughs, and sanitary pipes; Messrs. Ramsay and Co., Swalwell, have erected a substantial arch of fire-bricks; and Messrs. Harriman, Newcastle, have built a beautiful glazed-brick wall about 21 feet by 9 feet. Lucas Brothers, of Dunston, have a fine assortment of fire-clay retorts, fire-bricks, and other goods. Messrs. William Stephenson and Sons, Throckley, exhibit retorts of a very heavy kind. Joseph Cowen and Co., Blaydon Burn, exhibit gas retorts, bricks, and other articles; and Mr. H. Forster, Backworth, has a similar display. Similar displays are made by Wm. Love, Ganister Fire-stone and Clays, Wolsingham; Robert Boyle and Son, Limited, London, ventilating and sanitary appliances; the "Eon" Ventilator Company, Bryson Street, Newcastle; Rimmington Bros., Newcastle, bricks, &c.; Lambton sanitary pipes, manufactured by the Earl of Durham; King, of Stourbridge, bricks, terra-cotta, &c.; North Bitchburn Coal Company, sanitary pipes, terra-cotta; Normanby Brick and Tile Company, Middlesbrough; Hannington and Co., Swalwell; Ferens and Love; Richard Kell and Co., Newcastle, grindstones; Ord and Maddison, Darlington, stones, &c.; Robert Robson, Wideopen Quarry, grindstones; W. B. Wilkinson and Co., Newcastle, a magnificently built display representing marble, plaster, tiles, &c.; John Dove and Co., Newcastle, baths, earthenware, &c.; T. Stapleton and Co., Northfleet, Kent, mill wheels, &c.; Strakers and Love, Newcastle, siphon and closet traps, &c.; Lowood and Co., Sheffield, silica bricks; Benson and Son, Newcastle, bricks, tiles, &c.; Lunley Brick Company, Fence Houses, glazed and white bricks, retorts, &c.; Carr and Sons, North Shields, terra-cotta, &c.; Walbotte Coal and Firebrick Company, Scotswood, coal, firebricks, &c.; Thubron and Co., Newcastle, sanitary pipes, &c.; Jameson and Sons, Huddersfield, bricks, chimney-pots; Silica Firebrick Company, Sheffield, Bonnybridge Silica Fireclay Company, and the Aluminia Brick Company, Sheffield, similar exhibits.

Messrs. W. E. Foggin and Co., Newcastle, are exhibiting in the North Gardens a large Rosary, one of the largest, in fact, designed and built in this part of the country. It consists of four arches, joined to each other by panels of trellis, over which climbing plants are being trained; a dome-shaped roof of wire, surmounted by a representation of a crown wrought in the same material. The firm also show other fine exhibits.

One of the most interesting of the exhibits in the North Gardens is that of ensilage-making, as exemplified by the Aylesbury Dairy Company, who are the sole licensees for Great Britain of the process patented by Mr. C. G. Johnson, of Oakwell Croft, for making it in the open air in stacks, instead as at first introduced in this country in pits or silos. It was at first intended to have shown the process very completely, but at this season of the year green grass or other forage is of course unattainable, and therefore straw has been resorted to, and a very neat stack put up to show the method of working.

PART IV.

THE EXHIBITION AND THE EXHIBITS.

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THE NORTH COURT.

The North Court of the Exhibition is that along which the visitor looks immediately upon his passing the turnstiles of the partition that divides the entrance hall from the main building. It is the largest of the courts, being made up of one spacious arcade, thirty-five feet high, with a smaller avenue, thirty feet high, adjoining on each side, each of the three being 430 feet long and 50 feet wide. This court, moreover, contains those exhibits which are the most important, and which will probably be considered to be the most interesting. This, the first glimpse that is obtained of the interior of the Exhibition, is striking in the extreme. Above and on either side of the entrance gates are arranged trophies of swords, and helmets, and breast plates, which our forefathers used in battle many centuries ago, and which have been sent down from the Tower of London. The cold glitter of the armour is amply relieved by the brightness of the bunting and the flags, and Eastern carpets which Messrs. Coxon and Co., of Newcastle, have here set up. Looking down again, one sees more that is warlike, for the space immediately in front is occupied by an arsenal in miniature, in which are grouped numerous guns, great and small, some with their muzzles pointing grimly towards those who enter, and others presenting a complication of machinery which it is difficult for the uninitiated to comprehend. On either side repose huge locomotives in stately magnificence, with never a speck to sully the brightness of the enamel which encases them. In the centre towers the dove-coop, wonderful on account of its massiveness and its intricate carving, which has been lent by the Prince of Wales. Near to it are more engines of destruction and of peace; besides monster marine boilers, and other productions of marine engineers; iron and steel in all their various stages of manufacture, giant castings and forgings, a bewildering display of wheels and tubes, metal manufactures, great blocks of coal, musical instruments, models, minerals, and photographs—indeed, a perfect forest of stands, in ebony and gold, on which are exhibited the work of numberless artisans employed in hundred different crafts. Beyond all, and reaching up almost to the roof, one sees the grand organ, and beneath it the orchestra where the concerts will take place during the holding of the Exhibition. The prevailing tint in the North Court is green, a colour which has been objected to by some of the exhibitors on the ground that it absorbs much light, and does not set off the exhibits to so much advantage as a warmer colour might do. There may be something in this suggestion, but to the ordinary visitor, looking down the main avenue, the general effect is extremely pleasing.

THE BIG GUNS.

So much for generalities. The visitor who wishes to make a detailed inspection of the exhibits in the North Court, if he does it conscientiously, will find that the greater portion of a morning or afternoon has passed away before he has been able to accomplish his desire. Moreover, he will find sufficient to sustain his interest during the whole of the time which he devotes to the undertaking. At the entrance end of the court, on the right and left, are a couple of handsome pavilions, fashioned in ornamental ware-work by Messrs. Doulton, of Lambeth. They are real works of art, and are rendered additionally attractive by the circumstance that they are adorned with several local views, executed by the "special artist" of the firm. Between these two erections is a striking statue by Birch, called the "Last Trumpet Call," and just beyond is the space devoted to the exhibits of war weapons and their appliances shown by Sir W. G. Armstrong, Mitchell, and Co., of the Elswick Ordnance, Engineering, and Shipbuilding Works, Newcastle. The collection is unique, and in it are shown specimens of the principal weapons, if not of all, that are turned out in the vast works at Elswick. The most prominent of them is,

beyond question, the monster 110-ton gun, which is here represented by a full-sized wooden model, the gun itself being too heavy to be transported on any roller in existence. And yet, as the imitation weapon lies there, with its breech in a well, and its muzzle pointing obliquely towards the roof of the building, no one, ignorant of its material, would imagine for a moment that it was not the "real thing." The gun, of which this is a fac-simile, is the largest ever fashioned in this country, and is more powerful even than the larger weapons that have been made in Germany. It is just 44 feet long, and the diameter of its bore is 16½ inches. The actual weight of the real gun is 247,795 lbs., or about 1,400 lbs over 110 tons. The weight of the projectile for the gun is 1,800 lbs., and it is fired by a charge of 960 lbs of powder. When the shot leaves the muzzle it is travelling at the rate of 2,128 feet per second, and it is able to penetrate nearly 34 inches into an armour plate. The mountings of the gun are of steel, and are necessarily very massive. Two of these great guns are to be placed on board the armour-clad Victoria, which was launched at Elswick a month ago. On that occasion Sir William Armstrong, contrasting the armour of the Victoria with that of Lord Nelson's ship, the Victory, said that the handling of these monsters to-day was made practicable by means of the application of hydraulic power, and this is explained in the model under notice. The gun is loaded, elevated, and depressed by means of the pressure of water admitted to different parts of the machinery employed, and even the charge is sent home by a hydraulic ram. The gun, in its real form, is made entirely of steel. The inner tube is one piece, forming the foundation for the gun. The outer "rings" are wrought separately, and are placed, while hot, over the inner tube. Then, shrinking as they cool, they become firmly fixed over the bore, which is itself prevented from moving away from the breech by means of a bronze ring let in to the front of the breech piece. The cost of the 110-ton gun is about £34,000, and on every shot fired a sum of £188 is expended. Other smaller cannon are shown, but otherwise similar to the 110-ton gun. Next in interest is the rapid-firing gun, a species of weapon in which the Elswick firm has recently effected considerable improvements. The rapidity with which this gun can be fired is due to the fact that the projectile and shell are contained in one cartridge—pretty much as in a rifle cartridge—and that, by means of simple machinery, the weapon may be raised or lowered, or moved round, like a crane, with the greatest ease and quickness. The 30-pounder rapid-firing gun is made of steel, it is 14 feet 2½ inches in length, and its 30lb. shell is projected by 91bs. of powder, the discharge being effected either by electricity or in the ordinary way. The carriage works on a pivot, and is protected by a shield of steel: and the gun itself is capable of firing ten rounds every minute. The penetrating power of the shell is very great, and the weapon is designed to be especially useful in case of an attack by torpedo boats. Much interest will, doubtless, be excited by the disappearing gun, which is shown on the left side of the Elswick firm's trophy, and whose object is to protect guns more completely than has previously been possible in coast defences. The gun is made to disappear from the view of the enemy by means of hydraulic power, in the simplest way imaginable. The "trunnions," or steel arms, that project on either side from the shoulders of the gun, are placed on the upper end of two elevators, which are pivoted at their other end on the front part of the carriage. Fixed to a cross-bar between the two elevators is the end of a ram, which works in a cylinder placed between the girders of the lower carriage. In this cylinder are two chambers, one containing water, and the other air. As the gun descends, the ram drives the water from one chamber into the other, where the air is compressed into a small compass. Then, after the gun has been loaded, a valve is opened, and the compressed air

drives the water back into its own chamber, the gun being thus raised into position for firing. The carriage itself revolves on a centre pivot, and is so constructed that the gun is capable of firing over a platform nine feet high. It is furnished with reflecting sights and steel elevating arcs. A small auxiliary pump is worked by the men, enabling the gun to be lowered in a few seconds from the firing to the loading position. By means of handwheels, the gun can be traversed a complete circle with facility. Beside these powerful weapons, the field and mountain guns and howitzers look like mere playthings, but they are, nevertheless, even more useful in certain kinds of warfare. An extremely neat-looking 12-pounder field gun is shown, whose weight is 7 cwt., and whose length is 7 feet 6 inches. The weight of the shell, when filled, is 12 lbs. 8 oz., the charge weighing $4\frac{1}{2}$ lbs. Its neighbour is a 7-pounder mountain gun, which, for easy transport, is screwed together in two parts. Each half weighs only 200 lbs., and the carriages, ammunition, and gear are also easily portable. The total length of the gun is 5 feet 10 $\frac{1}{2}$ inches; the shell weighs, when filled, 7 lbs. 6 oz., and the charge used is $1\frac{1}{2}$ lbs. This gun is especially handy in hill warfare, when it can be carried, in its divided parts, by mules. A larger gun, firing a 25-lb. shell, is also exhibited, capable of being divided into three parts, each of 896 lbs., for transport by elephants. A field howitzer is shown, whose total length is 5 feet 10 $\frac{1}{2}$ inches, and whose weight is 416 lbs. The shell weighs 15 lbs., and the charge $2\frac{1}{2}$ lbs. In close proximity stands a specimen of the deadly Gatling, or machine gun, which can fire from 800 to 1,000 rounds a minute. There are ten barrels, grouped round a central spindle; and at the breech end is a "feed drum," holding 104 cartridges. A handle is turned, the cartridges are, with almost inconceivable rapidity, pushed into the barrels, fired and withdrawn. The destructive power of this weapon, when directed against the close ranks of an army, is very great; and it was used with terrible effect during the recent campaigns in Egypt.

THE PROJECTILES.

Of the projectiles from the foundry at Elswick, the largest is that used in the 110-ton gun; it is a 16 $\frac{1}{4}$ -inch steel shell, weighing no less than 1,800 lbs. There are, besides, steel shells made for the purpose of penetrating the sides of armour-clad, common iron and steel shells for use against the unarmoured parts of war vessels, troops, earth works, &c., Shrapnel shell, and case shot. The different kinds of gun carriages and mountings will also be found interesting; while the development in the making of guns is demonstrated by the display, alongside the modern weapons, of Armstrong guns of an early make.

THE LOCOMOTIVES.

Turning from these destructive war-weapons, attention will be naturally given to those instruments of peace, the locomotives, which form a very prominent feature in the North Court. To the left, one sees giant engines under the signs of Robert Stephenson and Co., Newcastle, R. and W. Hawthorn, Forth Banks, Newcastle, and Messrs. Black, Hawthorn, and Co., Gateshead; while on the other side are the exhibits of the North-Eastern and Great Northern Railway Companies. The engine nearest the door, on the visitor's left as he looks down the court, is that which was built by Messrs. Robert Stephenson and Co., to the design of Mr. W. Adams, locomotive superintendent to the London and South-Western Railway, for the fast main line traffic between London and Exeter. Technically, it is called an "outside cylinder four wheels coupled bogie passenger express engine," and it is fitted with Adams's patent vortex blast pipe, which has been in use on the L. and S. W. Railway since August, 1885, and has effected great economy in the consumption of fuel. The tender carries 2,800 gallons of water and 3 $\frac{1}{2}$ tons of coal, and the total weight of engine and tender is 78 tons. The same firm exhibits models of the early engines built by them, including "Locomotion No. 1" (1825); "The Rocket," built in 1829 for the Liverpool and Manchester Railway; and the "Invicta" (1830), for the Canterbury and Whitstable Railway. There are besides, numerous drawings of engines, early and modern that have been turned out by the firm; and a pair of Garrett's patent weighing tables, for weighing locomotives. The great engine is a handsome structure, and the

polished steel rails that enclose it will doubtless be surrounded by crowds of admirers during the exhibition. In a line with Messrs. Stephenson's exhibit, Messrs. R. and W. Hawthorn, of the Forth Banks Department of Messrs. R. and W. Hawthorn, Leslie, and Co., show an engine that has been specially designed for an Australian railway, whose gauge is 3 feet 6 inches. It is capable of taking a load of 200 tons up an incline of 1 in 60, at a rate of 15 miles per hour, and its total weight, in working order, is 27 $\frac{1}{2}$ tons, the maximum weight on any axle being 6 tons 13 cwt. The tender holds 1,200 gallons of water, and has 200 cubic feet of fuel space. The line for which the engine is intended passes through virgin soil, and the engine is fitted with a cow-catcher, a steam cattle alarm, a pump, an injector, and a water raiser for supplying the tender with water from wells by the side of the track. There is also a large head lamp fitted with an electric light of 800-candle power, able to illuminate the track for a quarter of a mile ahead, and driven by a Parson's high-speed motor of $2\frac{1}{2}$ electric horse power. The engine is of steel, principally, and can be driven up to forty miles an hour. Beyond, much interest will be centred in the three locomotives exhibited by Messrs. Black, Hawthorn, and Co., Gateshead—two representing their standard type of tank locomotives, and a specimen of their compound surface condensing tramway engine. The larger of the two locomotives is made for use on branch lines, or at collieries and docks, and is provided with a patent axle for sharp curves. The water tank, holding 700 gallons, is placed near the boiler, with the coal bunker behind; and the driver's cab is large and roomy, affording him excellent protection from the weather when it is inclement, and allowing him, at the same time, to keep a good look-out ahead. In working order, the engine weighs 26 tons, and, in commemoration of the Queen's Jubilee, it has been named "Victoria." It is neatly painted in blue, and is altogether a handsome piece of mechanism. The second locomotive is a four-wheeler, and is meant for use on light railways at mines, coke ovens, steel works, and the like. It weighs only some 5 $\frac{1}{2}$ tons, but it is very compact and complete in all its details. The engine bears the euphonistic name of "Yum-Yum," and is prettily painted on a black ground. The tramway engine, shown by the same firm, has been working on the Gateshead tramways, where it has run more than 1,600 miles, drawing a load averaging about 9 tons. Its weight is 10 $\frac{1}{2}$ tons, and its consumption of coal is exceedingly small. Our great local railway company—the North-Eastern—have spared no pains in making an attractive show in the space allotted to them on the right of the main court. Their chief exhibit is a four-wheel coupled express compound passenger engine, with tender complete, which was designed by Mr. T. W. Worsdell, locomotive superintendent of the company, and built at the company's works at Gateshead, for the main line express passenger service between York and Edinburgh, where it has been running for three months with successful results. This locomotive, which, with its tender, weighs 75 tons, was drawn to the Exhibition by a team of 58 horses. The large wheels are 6 feet 8 inches in diameter, and the smaller ones 4 feet 6 inches; the tender carries 2,500 gallons of water and 5 tons of coal, sufficient to run an express from Newcastle to Edinburgh and back. The Worsdell and Von Borries system, on which the engine is constructed, effects a great saving in fuel, for the high pressure steam from the boiler passes through two cylinders before its force is exhausted, double work being thus got out of it. As to speed, 75 miles an hour have been covered by the engine, which, by the way, is the first of its class built on the banks of the Tyne. This company exhibits, also, a magnificent six-wheeled saloon carriage, made by themselves at York. This carriage is 34 feet in length, and weighs 15 tons. Its appurtenances are most luxurious. The entrance lobby is richly decorated; there are handsome walnut panels on each side, relieved by light polished woodwork, and the roof, which is arched, is also prettily ornamented. Inside are the most seductive easy chairs and couches, all splendidly upholstered; the floor is covered by a costly carpet, and the sides are lined with mirrors. Besides other conveniences, there is a neat lavatory. The carriage represents to the mind of

the visitor the perfection of railway-travelling. The company show, besides, a steel crank axle, and numerous drawings of compound passenger and goods engines for their lines, on Worsdell and Borries' system. The Great Northern Railway Company is represented by an express passenger engine and tender, designed by Mr. Patrick Stirling, and built in the company's works at Doncaster. This engine, without a tender, weighs 47 tons, and its driving wheel is 8 feet across. The cylinders are 18 inches, and the stroke 28 inches. Its boiler is 11 feet 5 inches long, and 4 feet 2 inches in diameter; the wheel base is 22 feet 11 inches; the heating surface is 1,043 square feet; and the tank holds 2,900 gallons of water, the fuel carried being 4 tons of coal. These figures are given in detail in order that the huge engine may be the better compared with the ancient "Locomotion No. 1" which has been placed alongside of it by the North-Eastern Railway Company. This engine was used in 1825 on the Stockton and Darlington Railway, which was the first public railway in England; and it has a quaint, old-world look beside its representatives of to-day. The cylinder of George Stephenson's engine is a vertical one, and is 10 inches in diameter, with a stroke of 24 inches. The horse power was 16, and its speed per hour was eight miles. The length of the boiler is 10 feet and its diameter 4 feet. The heating surface was 60 square feet, and the total weight of the engine is $6\frac{1}{2}$ tons. There are four wheels, each 4 feet across, and the total wheel base is 5 feet 4 inches. The square tank will hold 240 gallons of water, and there is room for a ton and a half of coal. To the ordinary spectator, looking at the two engines, the wonderful development since the birth of railways is apparent, but the figures that have been quoted will enable him to grasp more completely the actual advance that has been effected. In connexion with rolling stock, Mr. F. W. Mildred, of Middlesbrough, exhibits his patent apparatus for coupling and uncoupling railway waggon without the necessity, danger, and inconvenience of getting inside the trucks. An apparatus for effecting the same purpose is exhibited by Mr. F. Liddicoat, of Gateshead.

MARINE ENGINEERING.

Proceeding up the main arcade, one comes, just beyond the Armstrong exhibits, into the domain of marine engineering—a very attractive section to ordinary sightseers, who are enabled to inspect closely the boilers and engines that drive our modern steamships through the water. On the right is the space occupied by the exhibits of Messrs. R. and W. Hawthorn, Leile, and Co., of St. Peter's, Newcastle. Chief among these is a triple expansion engine, No. 2,076, of the kind fitted into torpedo cruisers, combining the maximum of power with the minimum of weight. The cylinders are respectively 20, 27, and 40 inches in diameter, with a stroke of 18 inches; the indicated horse power developed being 1,800, with a steam pressure of 160lbs to the square inch. The engine is beautifully finished, and is certain to be greatly admired. The "next door neighbour" of the St. Peter's firm is Mr. Thomas Adams, of Manchester, who has a comprehensive display of spring safety valves for all kinds of boilers, besides spiral springs made by special machinery, and pumps of various kinds. To the left is a huge marine boiler manufactured by the Wallsend Slipway and Engineering Company. This is of the multi-tubular type, fired at one end, and is intended to illustrate the latest advance in the design and construction of marine boilers for the supply of steam to triple expansion engines. The outside diameter of this massive structure is fourteen and a half feet, its length over all being 11ft. 2in. It has three corrugated furnaces, each opening into a separate combustion chamber; its working pressure is 150lbs., its heating surface 2,200 square feet, and it is capable of developing 800 indicated horse-power. The boiler is constructed wholly of steel, manufactured on the Siemens-Martin process by the Steel Company of Scotland. The noticeable largeness of the plates is for the purpose of removing, as far as can be, all longitudinal seams from the bottom. Each of the four plates composing the boiler weighs 62 cwt. The holes are all drilled by the use of special machinery, and the bending into shape of the plates is accomplished by hydraulic presses,

on Tweddell's system. Hydraulic power has also accomplished the riveting, and, indeed, in the whole structure hand work is reduced to a minimum. The total weight of the boiler is forty tons. Alongside the boiler is shown a working model of a device patented by Mr. Fraser, of Liverpool, for preventing the "racking" strains which are set up in a structure of such large diameter, owing to the variable temperature between the top and bottom of the boiler. The Slipway Company show also a beautiful little model, worked by electricity, of a pair of compound engines as fitted by them on board the steamers *Mameluke* and *Nedjed*, belonging to the Bedouin Steam Navigation Company, of Liverpool, to whom the model belongs; and there is, in addition, a stand of photographs illustrating the progress from the compound engines to the triple expansion engines of latest design. The company have two very large slipways capable of accommodating vessels of very large tonnage, and photographs are shown of the slipways and of some cases of heavy repairs that have been effected upon them. Altogether the exhibit is an admirable illustration of the marine industry as it is carried on along the banks of the river. Opposite to the large boiler is a beautifully decorated stand in the form of the ladies' cabin of a steamer, on which Messrs. Wigham Richardson and Co., of Low Walker and Wallsend, show a number of models of ships, engines, &c. The artistically finished panels that line the stand are by Messrs. Godfrey, Giles and Co., Lincrests decorators, of Park Street, London, W. Near at hand is a neatly constructed surface condensing screw engine, of 23 horse-power, exhibited by Messrs. Baird and Barnsley, of North Shields.

THE DOVE-COT.

Here the visitor comes upon a walk crossing the main court, and running from the North Grounds to the inner quadrangle. In the centre of this is placed the lofty carved pigeon house lent by the Prince of Wales. This is a marvellous piece of workmanship, but the general impression will probably be that it is somewhat out of place, for it obstructs to a great extent the view along the court, and dwarfs the exhibits that are near to it.

METAL MANUFACTURES.

Passing the dovecot, the visitor comes upon a section in which the different stages of iron and steel manufacture are illustrated, from the raw ore to the highly-finished articles of all kinds—tools, and wheels, tubes, chains, springs, axles, anchors, hoops, bars, and castings and forgings of all sorts and sizes. Some of these are in the main arcade, and others are in the smaller avenues that run on either side; but their nature and extent will probably be most conveniently grasped if they are noticed together. In order that the manufacture of the metal itself may be the more readily explained, attention may be directed at once to the exhibit of Messrs. Bell Brothers, of Middlesbrough, in the extreme left avenue, where the process of manufacturing a ton of metal from the Cleveland stone is fully and clearly illustrated. There is, in the first place, a block of ironstone measuring $10\frac{1}{2}$ feet by 2 feet 2 inches, from the Skelton Park mine, and weighing $66\frac{1}{2}$ cwt. The fuel used in the furnace is shown in the shape of sections of the Busty and Brockwell seams from South Brancepeth and Tursdale Collieries, weighing together $37\frac{1}{2}$ cwt., this being the quantity of raw fuel required for the making of the block of coke, weighing $22\frac{1}{2}$ cwt.—the quantity to be used in the blast furnace. A piece of limestone, weighing 11 cwt., from Messrs. Bell Brothers' quarries at Stanhope, represents the flux. Before being put into the furnace, the ironstone is roasted in order to expel the moisture and carbonic acid, and in this process it changes its colour from green to red, and loses about a quarter of its weight. In addition to the various matters put into the top of the furnace, a quantity of air, measuring, at ordinary atmospheric pressure, 165,000 cubic feet, and weighing 104 cwt., after being heated by the waste gases resulting from the combustion of the fuel to a temperature of 1,000 degrees, is blown into the furnace, and the result is to produce a ton of pig iron. The block shown by Messrs. Bell Brothers is split, to show the fracture; and a portion of it is planed, showing the finished surface of the iron. It will be noticed that the

materials that go into the furnace include 104 cwts. of air, 47 cwts. of roasted ironstone, 22 cwts. of fuel, and 11 cwts. of flux ; the result being 139 cwts. of gases, 20 cwts of iron, and 25 cwts. of slag. A piece of slag weighing 25 cwts. is shown. Such a comprehensive exhibit cannot fail to be interesting. At the left hand corner beyond the dovecot, Messrs. Ridley and Co., of the Swalwell Steel Works, show steel castings for engines, guns, hydraulic works, &c., and forgings for paddle wheels. Attention is particularly directed to an improved feathering wheel ; and the exhibit is completed by a good show of steel tools. The space beyond is occupied by Messrs. Hawks, Crawshay, and Sons, of the Gateshead Iron Works, with mooring chains, patent anchors, iron cables, models of a lighthouse, a screw pile pier, dredgers, &c. There is also an interesting model of one span of the High Level Bridge, and the firm show, besides, their account books for nearly 150 years back. To the right, the Farnley Iron Company, of Leeds, display their patent boiler flue, whose spiral corrugations aid combustion, and are calculated to resist collapse. On the adjoining stand, Messrs. John Spencer, of the Newburn Steel Works, Newcastle, have brought together an interesting variety of their products, among which may be mentioned their steel castings for ordnance, railway, marine, and hydraulic work, and for general engineering. There are also steel forgings and specimens of the "Newburn homogeneous iron." Just above this stand, Messrs. Charles Cammell and Co., of the Cyclops Works, Sheffield, show sundry heavy steel manufactures. Immediately opposite, the Darlington Forge Company have a really excellent show of crank shafts, wrought iron and steel axles, engine tender and truck wheels, a wrought iron guide ram, and other forgings. The stand next to it is likely to prove an attractive one. Upon it Messrs. Brown and Co., Limited, of Sheffield, display, through their Newcastle representatives — Messrs. Allen and Robson, of the Side—a piece of armour-plate, similar to that used in the construction of the armour-clad Victoria, at Elswick, and the belted cruisers Orlando and Undaunted at Jarrow. There are also two large propeller blades, one 6½ tons and the other 4½ tons ; a steel boiler plate (the largest ever rolled) containing 200 superficial feet and weighing over three tons ; a large steel hoop, numerous tyres, wheels, &c. There is, too, a "Brown's ribbed flue," which, it is claimed, combines the advantages of the longitudinal strength of plain flues with the great resistance to collapse under pressure obtained by the corrugated flues. The experiments that have already been made with the flue have proved very successful. To the left, beneath the shadow of Black, Hawthorn, and Co.'s engines, Messrs. J. and F. Howard, of Bedford, show patent steel sleepers for railways. Across the transept, the Darlington Steel and Iron Company have their stand, upon which are placed sections of steel and iron rails, sleepers, bars, &c., and illustrations are also given of the systems used in joining rails together on permanent ways. Opposite is the exhibit of the North-Eastern Steel Company, Middlesbrough, where the basic Bessemer process of steel manufacture is amply illustrated by the display of materials and specimens of the steel and slag. Next door, Messrs. Samuel Tysack and Co., of Sunderland, show specimens of iron and steel in their manufactured form. Opposite, Messrs. John Rogerson and Company, Darlington, have a stand on which they exhibit steel castings and forgings for various purposes, together with apparatus for boring, recessing, screw-cutting, drilling, sawing, and cutting out defective boiler tubes. The Weardale Iron and Coal Company, Limited, of the Tudhoe Iron and Steel Works, Spennymoor, have on their stand samples of the Weardale ores, limestone, coke, &c., and specimens of the finished iron and steel manufactured in numerous forms. Directly opposite, Messrs. Taylor Brothers and Co., of the Clarence Iron and Steel Works, Leeds, have samples of the best Yorkshire iron made into cranks, axles, tyres, boiler plates, angles, &c., as well as steel castings and forgings. Close to is the stand of the Consett Iron Company, Limited, with specimens on it of iron and steel plates, fuel, &c., besides numerous interesting photographs. Messrs. Chadburn and Son, of Liverpool, and Messrs. Watson, Laidlaw, and Co., of Glasgow, exhibit various

iron and steel manufactures. Steel and wire manufactures are exposed by Messrs. J. Shipman and Co., Sheffield ; and, on the opposite ground, is an extensive exhibit by Messrs. Snowball and Co., of the Crown Buildings, Side, Newcastle, comprising patent rolled shafting in iron and steel, couplings, forgings, axles, and bar iron, by the Kirkstall Forge Company. On a second section of the stand, Rodgers's wrought iron split pulleys are shown, as manufactured by Messrs. Hudswell, Clarke, and Co., of Leeds ; a third section contains specimens of their sheet iron made at the works of the Don Iron and Steel Company, Limited, Jarrow ; while a fourth is filled up with a collection of various kinds of shaft bearings, pedestals, brackets, flanged couplings, &c., all of excellent workmanship. On the adjacent floor space are placed several wheels turned out by Messrs. Perkins, Son, and Barrett, Bradford, Yorkshire. Messrs. Stevenson and Jacques, of Middlesbrough, have set up an exceedingly attractive stand, in which are artistically arranged specimens of iron ore, fuel, and other elements used in the production of Cleveland pig iron, specimens of castings made at their Acklam workshops ; and also, on behalf of the Framwellgate Coal and Coke Company, samples of their gas and bunker coals, and coke for blast furnace and foundry purposes. At the top of the left avenue, Messrs. Seebom and Dieckstahl, of Sheffield, display specimens of Swedish bar iron and steel, tools, and springs. In the other avenue, on the right of the main arcade, Messrs. Askham Brothers and Wilson, Sheffield, have a large stand for steel goods. In a handsome show case a little further down, the Barrow Haematite Steel Company, Limited, display ores and fuel and flux, and steel fashioned into the most beautiful and fantastic shapes imaginable. The Leeds Forge Company have an extensive exhibit, including machine-rolled corrugated steel boiler furnace flues, steel plates for boiler purposes, flanged frame plates for rolling stock, &c. Other exhibits, in the way of iron ore, iron and steel, manufactured iron and steel goods, forgings and castings, and the like, are shown by Messrs. John Bilsland and Co., Glasgow ; Palmer's Shipbuilding and Iron Company, Jarrow ; Wallace, Stout, and Co., Guildhall Chambers, Newcastle ; Messrs. George and James Bell, Edinburgh ; the Patent Nut and Bolt Co., London Works, Birmingham ; William Penman, Gateshead ; R. S. Bagnall and Sons, Winlaton ; the Winlaton Nut and Bolt Company, Limited ; Th. Nordenfelt, London ; Wasteneys Smith, Newcastle (anchors), and others. It would be difficult to conceive a more extensive or a more complete exhibition of iron and steel manufacture than all these different displays represent. Makers of metal tubes and pipes congregate in considerable numbers in the North Court. Near the top of the main arcade, the Anchor Tube Company, of Birmingham, have a stand of marine, locomotive, and stationary boiler tubes, gas, steam, and water tubes and fittings. Near to this, Messrs. Crewdson, Hardy, and Co., of the Yorkshire Tube Works, Middlesbrough, have a similar exhibit ; and, on the right, there is a large and comprehensive exhibit of tubes and metal by Elliott's Metal Company, Limited, Selby Oak Works, Birmingham. Huge turned and bored socket and spigot pipes, hydraulic pipes, pumptrees, joints, &c., are shown in the right avenue by Messrs. Cochrane, Grove, and Co., Middlesbrough ; and, on the other side of the main arcade, there is an excellent exhibit by the Credenda Cold-drawn Seamless Steel Tube Company, Birmingham. In the same avenue, Mr. Richard Oliver Heaslop shows tubes of all kinds, as well as brass and copper sheets, wire for various purposes, pulleys, shaftings, couplings, &c. Tubes of excellent workmanship are shown also by Messrs. David Richmond and Co., Govan and Glasgow, in the left avenue. Messrs. Allen Everitt and Sons, of Birmingham, contribute a capital collection of tubes, as well as brass and copper sheets, wire, rods, &c.

THE "CHRONICLE" STAND.

Near the top of the main avenue, a little to the right, is the office of the Newcastle *Daily, Evening, Weekly, and Monthly Chronicles*. It is an elegantly-designed stand, in black and gold, and there is a counter where, during the Exhibition, copies of all the editions of each of the publications will be on sale, and where advertisements will be received. On each side of the neat frame which

surmounts the stand are placed specimen sheets of all the issues, including a fac-simile of the original *Chronicle*, published in 1764. Copies of this reproduction will also be on sale. The "Jubilee Chronicle," which is a reprint, in handy form, of this supplement, may also be had here.

PAINTS, OILS, &c.

The paint, oil, and varnish manufacturers are strongly represented in the right-hand corner at the top of the North Court. Here are the stands occupied by Messrs. John Ismay and Son, Groat Market, Newcastle; Messrs. Mawson, Clark, and Co., Mosley Street and Heaton, Newcastle; Mr. G. Frater, Pilgrim Street, Newcastle; Messrs. John Greene and Sons, Gateshead; Mr. E. T. Shields, Sunderland; Mr. James Arnott, Newcastle; The Dee Oil Company, Chester; Crichton's Oil House, Newcastle; the Tyne Paint Company, Newcastle; Messrs. R. Henzell and Co., Close, Newcastle; Barton, Parr, and Co., Newcastle; Messrs. Englebert and Co., London; Price's Patent Candle Company, Battersea, London; Messrs. W. H. Holmes and Sons, Newcastle; Messrs. E. Wilkins and Co., London; Messrs. W. F. Mather and Co., Newcastle; Messrs. A. B. Fleming and Co., Edinburgh. Anti-fouling compositions are shown by Mr. J. A. Ryrie, Wallsend; Messrs. Hartmann, Newman, and Co., Newcastle; and M. Holzapfel and Co., Newcastle. On a brightly-decorated stand are exhibits of the "Sunlight" soap, by Messrs. Lever Brothers, Warrington; sanitary soap powder is shown by Messrs. F. J. Harrison and Co., Leicester; and hard and soft soaps are exhibited by Messrs. A. Ogston and Sons, Aberdeen. In the same corner, Messrs. MacNicoll and Co., Glasgow, show a patent self-housing arrangement for anchors, &c.; the Newcastle and Gateshead Gas Company exhibit samples of products arising from the distillation of coal for gas manufacture; Mr. A. S. Barnfather has a stand for specimens of British and foreign herbs and roots, &c.; Messrs. G. Davidson and Co., Gateshead, exhibit flint and coloured glass ware; and Messrs. Poole and Alexander, Edinburgh, show articles connected with the toilet. Toilet exhibits are displayed also by Mr. Jas. Dellow and Mr. J. B. Donnell, Newcastle. In the same neighbourhood are exhibits by G. J. Hewlett and Sons, export druggists, London; "Maignen's Filtre Rapide," London; and specimens of antimony ore from the Tapada Mine, Lisbon, shown by Mr. Emmanuel, of London.

MUSICAL EXHIBITS.

The musical exhibits have been grouped, very appropriately, in the neighbourhood of the organ and orchestra. Concerning the organ itself, this has been erected by Messrs. Lewis and Co., Limited, of London, at the expense of Mr. Charles Mitchell, of Jesmond Towers, and it will ultimately be placed in the new church of St. George at Jesmond, the gift of the same gentleman. Its principal specificiations are:—Choir organ, CC to A, 58 notes; great organ, CC to A, 58 notes; swell organ, CC to A, 58 notes; pedal organ, CCC to F, 30 notes. There are five couplers. The instrument has already been played upon, and its tone is sweet and powerful. On a handsome and substantial stand in the right avenue, Messrs. A. Hirschmann and Co., Pilgrim Street, Newcastle, have placed three cottage pianos, specially made in Berlin for this Exhibition; two concert grand pianos, and a Technicon, which is an apparatus for developing technique more effectively than the piano. Messrs. Waddington and Sons, of York, exhibit several highly finished rosewood and walnut pianos; and a similar exhibition is contributed by Messrs. E. Bishop and Sons, London. Messrs. Woods and Co., of 152, Westgate Road, Newcastle, have a capital collection of brass, wood, and percussion instruments used in military and brass bands; and, in a handsome case opposite, Messrs. R. J. Ward and Sons, of Liverpool, exhibit a number of beautifully made instruments of several kinds.

WIRE ROPEs, &c.

In the North Court, also, the rope industry is strongly represented. To the extreme left, Messrs. Joseph Crawhall and Sons, Newcastle, show a flat plough steel rope, 480 yards long, 3 inches wide, and $\frac{1}{2}$ of an inch thick, whose working load is 6 tons and breaking strain 60 tons. There are also two steel hawsers and samples of brattice cloth, and a case with various other samples of ropes.

Messrs. Dunn, Humble, and Co., of Newcastle, also have a good display of ropes and hawsers. Below is a neatly-arranged trophy by Messrs. Haggie Brothers, of Sunderland, made up of round and flat wire ropes and hawsers. Below this is an artistic pyramid of polished wood, relieved by specimens of wire rope and hawsers, manufactured by George Cradock and Co., of Wakefield. Messrs. Dixon, Corbett, and Co., and R. S. Newall and Co., of Gateshead, have also a neat and effective stand, showing sections of untwisted ropes for mines, ships, &c.; and there are similar exhibits by Messrs. R. Hood Haggie and Son, of the Willington Hemp and Wire Rope Works. On the left, against the wall, is Nesbit's patent gear for detaching ship's boats in an easy and rapid way. To the right is a complete exhibit of the Ashbury Railway and Car Company, Manchester, including a handsome reversible tram-car, to be drawn by two horses, and to carry 40 passengers—17 inside and 23 outside. There is also an iron tipping wagon, a hopper wagon, and railway carriage and tram wheels. Near to this stand, a small but interesting stand is shown by Messrs. Harrison Ainslie and Co., of Liverpool, containing Lancashire ore and pig iron. On the other side of the cross aisle, the Phosphor Bronze Company have some beautiful articles, including a propeller in Phosphor bronze. On the right, just before the N.E.R. exhibit, is a monster crank shaft, built for a triple-expansion marine engine by Mr. John Dickinson, Sunderland. On the left, Messrs. Douglass Brothers, Limited, of the Globe Iron-works, Blaydon-on-Tyne, have an interesting collection of exhibits in manufactured iron. These include the model of an iron roof for engine and boiler shops of neat design; the Rockliffe patent doors for ships' deckhouses and galleys, now extensively used; Douglass's patent furnace fronts for marine boilers, as well as an improved front arranged with air chamber for a sufficient supply of hot air, in order practically to obtain complete combustion, thus effecting a very considerable saving in fuel. An improved smith's hearth is also shown complete with tuyers, and it is a good forge. There are, besides, various specimens of shoes, a capital display of smiths' work, slips for wire rigging, block bindings for internal bound blocks, Douglass's mode of patent coupling, &c. Below, Messrs. Scriven and Co., of Leeds, exhibit machines for planing iron and steel angles and bars, for cutting circular holes in metal plates by hand power, &c., with numerous photographs. Messrs. Nicholson and Co., of Hebburn, show parts of a boiler. Behind, Messrs. Smith Brothers and Co., of Nottingham, have an attractive show of lubricators, steam whistles, gauges, &c.; and, on the adjoining stand, Messrs. Smith and Stephens, of Sunderland, display their patent interchangeable chain wheel. On the left of the North-Eastern Railway exhibit, Messrs. S. Thompson and Son, coal boring machine makers, Backworth, exhibit specimens of their work; and, close to it, Messrs. Bickford, Smith, and Co., of Cornwall and Lancashire, display safety and instantaneous fuses and igniters for blasting coal and stone. A similar display is made by the Compressed Lime Cartridge Company, who illustrate the system of coal getting as it is in use at Shipley Collieries, Derby. Here Mr. Edward Cleannett, of West Hartlepool, has placed a model of his improved apparatus for raising and lowering carriage windows—a system which dispenses with straps, and which offers numerous advantages over the old method of moving carriage windows.

NAVAL ARCHITECTURE.

Passing the stand of Messrs. R. B. Charlton and Co., of the Manors, and S. Smith and Sons, Nottingham, the visitor finds himself in the region of naval architecture, initiated by two marvellously beautiful models, sent by Messrs. James and George Thompson, of Clydebank. One is a miniature of H.M. cruiser Scout, of 1,200 tons displacement, 3,500 horse-power, and 17 knots an hour speed; and the second is a model of the a.s. America, a mail and passenger boat between Liverpool and New York, with a speed of 19 knots an hour. Below there are some lovely models of war vessels and steamships from Messrs. Palmer and Company's shipbuilding yard at Jarrow, and others from the yard of Messrs. C. S. Swan and Hunter at Wallsend. Sir W. G. Armstrong, Mitchell, and Co., of

Elswick, contribute models of numerous ships turned out both at Low Walker and at Elswick, including a handsome model of H.M. armour-clad Victoria, now in course of construction. Messrs. Schlesinger, Davis, and Co., of Wallsend, also exhibit several models. Some very fine models are also exhibited by Messrs. Robert Thompson and Sons, of Sunderland, including miniatures of the sailing ship Bhotan, the s.s. Sumida, and the cable ship Citta di Milan. A large number of models are exhibited by the Italian Government, through Mr. H. F. Swan, Newcastle; and others are shown by the Trinity House, London; Mr. J. H. Ritchie, Edinburgh; the Sunderland Shipbuilding Company, Limited; Messrs. J. L. Thompson and Sons, Sunderland; Messrs. W. Milburn and Co., Newcastle; Messrs. Rayton Dixon and Co., Middlesbrough; Messrs. W. Dobson and Co., Low Walker; Messrs. S. and H. Morton and Co., Leith, and others. In the bottom corner of this avenue are Messrs. Sample and Ward, of Blyth, have on exhibition an exceedingly simple and effective method of picking up and detaching ships' boats in heavy seas, dispensing with tackle fall, hooks, and rings. Here, also, are exhibits by Mr. R. J. Turk, boatbuilder, Kingston-on-Thames; T. G. Tagg and Son, Island Launch Works, East Molesley, Surrey; William Mills, Southwick, Sunderland, patent boat-lowering gear; Mrs. A. M. Wood, Westminster, lifeboat models; Capito and Hardt, London, the "Rung" pneumatic speed indicator; R. Irvine and Co., West Hartlepool, photographs; and George Thwaites, Stockton, side-light cutting machine and cork-drawing machine. Crossing again the main arcade, the visitor enters the left avenue that runs at a right angle with the East Court. Here, at the corner, is an upright stand with a neat display of sword cutlery by Messrs. Noble and Son, of Birmingham. Above it, hardened steel safes, designed to resist fire or to defeat the evil intentions of burglars, together with bolts, locks, &c., are shown by Messrs. Chubb and Son, of London and other places. Beyond it, on the same side, there are instruments and materials useful alike in peace and in war. The Nobel Explosive Company, of Glasgow, through Mr. F. H. Edwards, of Newcastle, show detonators and fuses, gelatine-water cartridges for use in mines, &c. Mr. W. R. Pape, gun maker, of Newcastle, has the adjoining stand, on which he has placed an interesting collection of guns, rifles, and revolvers; and next to Mr. Pape are Messrs. John Hall and Son, of London and Faversham, with cunningly-designed imitations of all kinds of gunpowder, and a number of empty cases and canisters. The Newcastle Chilled Shot Company and Messrs. Armstrong and Co., gun makers, Neville Street, Newcastle, also have exhibits adjoining. Messrs. Head, Wrightson, and Co., of Stockton-on-Tees, are represented by an exhibit of considerable interest, including a model fashioned in type metal of a portion of a bridge over the river Sutlej, on the Indus Valley Railway; and a model of a bridge over the river Ibicuy, on the Brazil Great Southern Railway system. Hydraulic screwing gear, a hydraulic drop for lowering wagons at blast furnaces, a blast furnace charging apparatus, and a hydraulic centre crane for steel plant are also described. After this firm, Messrs. William Simons and Co., of Renfrew, Scotland, exhibit several interesting models, chiefly in respect of improved dredge plant. There is a model of a combined hopper and dredger, the invention of this firm—a vessel into whose hull the dredgings are deposited, and then conveyed to the place of discharge. The dredger is capable of carrying 1,500 tons of spoil, dredging to 40 feet, and raising the enormous quantity of 500 tons per hour. Its speed under steam is nine knots an hour. The vessel can be fitted with side shoots, to fill barges and punts; and, if fitted with the patent traversing bucket ladder, can cut its own flotation. No fewer than twenty-seven vessels of this type have been built by Messrs. Simons, and its advantages over the old form of dredger are apparent to anyone. Another model is that of a ferry steamer, with a platform that can be elevated or lowered, whereby passengers, vehicles, or horses can be embarked without difficulty, irrespective of tide, rendering floating slips unnecessary. This firm show also a number of photographs, illustrative of the

types of vessels built by them, including a picture of a powerful hopper-dredger recently made for the Bristol Corporation, having two propellers behind and two at the bow, driven by two sets of triple expansion engines; and with three rudders, by which it may be manœuvred easily and promptly. A series of most interesting models is shown by the Clyde Navigation—a body corresponding with the Tyne Commissioners—including models of a quay wall on concrete cylinders, a single and double ladder dredgers, a dredging plough, spoon a gas-lit buoy, a horse and cart steam ferry, and several excavators. In a partitioned recess is a considerable amount of wall space occupied by "Lloyd's," who display a variety of models illustrating the development of ships during the last 120 years. There are also models of the earliest marine engines, including the original engine of the steamer "Comet," the first vessel propelled by steam, in 1872. In this recess, also, Messrs. Clark and Standfield, of London, show two or three models of docks, and Mr. E. C. Greenway Thomas, of London, exhibits his breakwater—an ingenious contrivance for sheltering harbours from the stormy weather, illustrating his invention by means of highly original drawings and models. In close proximity, the River Tyne Commissioners show a beautiful model of part of the harbour, showing the High Level Bridge, with, beneath it, a working model of the Swing Bridge. The Commissioners show also working models of the mammoth cranes in use at the North and South Piers at the mouth of the river, besides a model of Shields harbour and entrance to the River Tyne, and other models. The River Wear Commissioners, too, exhibit an interesting collection of models, chief among which is a working model of a 50-ton radial crane for setting 45-ton concrete blocks, faced with red granite, at the Roker Pier, Sunderland, constructed from designs by Mr. H. H. Wake, C.E. There are models also of a dredger, hopper barge, and a screw steam barge. The Wear Commissioners have, in another portion of the court, a model of the Sunderland Docks, also from the plans of Mr. Wake. A neatly-made model is also shown of the Wallsend Pontoon Dock, which is 300 feet long and 70 feet wide, and capable of lifting vessels of 3000 tons weight.

CHEMICAL INDUSTRIES.

Further up the court, the chemical industries of Tyneside are represented upon a handsome stand, the result of the combined efforts of the Newcastle Chemical Company, Gateshead; Charles Tennant and Partners, Limited, Jno., Geo., and W. H. Richardson, Jarrow, and the Jarrow Chemical Company. There are samples shown of manganese, pyrites, nitrate of soda, soda, Durham and Northumberland coal, Durham salt, Durham limestone, caustic soda, chalk, and soda crystals. The whole is surmounted by a model, in soda crystals, of the Old Castle; and when the electric light is reflected upon it at night, it may be expected that the effect will be brilliant and striking. In the far corner, the St. Bede Chemical Company, Newcastle, have an attractive display of potash, baryta, soda crystals, sulphates of copper, iron, soda, &c., soda ash, copper precipitate, and numerous other chemicals; and Messrs. Bell Bros., of Middlesbrough, supply examples of Teesside salt, as well as of the process of manufacturing ammonia alkali by the Schloesing process, and of the manufacture of barium hydrate. The Washington Chemical Company also show several specimens of their products. Lead, in the ore and in its manufactured form, is shown by Messrs. Bewick and Partners, Hebburn; John Warwick, Newcastle; Messrs. Foster, Blackett, and Wilson, Newcastle; Jonathan Rutherford, Newcastle; Messrs. Fowler and Co., Great Placentia, Newfoundland; J. A. Jobling, Newcastle; and Messrs. Walker, Parker and Co., Newcastle.

COLLIERY APPLIANCES, &c.

Towards the end of the left avenue are sundry stands, including one of which Messrs. Dunford Brothers, of Newcastle, show their patent automatic greasing apparatus for lubricating coal tubs, together with miners' tools, and hardware goods. The Hodbarrow Mining Company, Cumberland, have also an attractive stand here; and the Isle of Man Mining Company show specimens of lead

and other ores from the Foxdale mines, Isle of Man. At the end of the avenue, Messrs. Joseph Cook and Son, of Washington county Durham, exhibit pit cages and tubs, &c. Messrs. Cook and Nicholson, of the Wear File Works, Monkwearmouth, exhibit numerous specimens of their work. Files of all descriptions, cuts, and sizes are shown, ranging from the huge file for armour plates, 2 feet long by 2½ inches square, and weighing 50lb., to the tiniest specimen for fine work. There will be a man working at a block, cutting files by hand. There is also a good display of engineers' and colliery tools, and tool steel. Messrs. Williams Brothers and Co., of Birmingham, in a pretty stand, show various domestic articles in brass work; and Messrs. John Mills and Sons, of the Forth Street Brass Works, Newcastle, have, adjoining the great organ, a spacious platform on which are set safety lamps, gauges, injectors, and various appliances in which the electric light is used. The Hardy Patent Pick Company, of Sheffield, and Burys and Company, Limited, from the same town, show picks of all kinds, boring machines for rock and coal, wedges, and tools. In front is a substantial stone structure set up by the Whitburn Coal Company. The stone is from the company's limestone quarries at Marsden, and it is dressed in various ways suitable for engineering and building purposes. There are also specimens of flags, kerbs, channels, and paving sets, as well as gate posts, pillars, and coping. In addition there are samples of coal, and other products of the company.

WORKING DAIRY.

Having concluded his tour of the ordinary exhibits in the North Court, the visitor will find much that is interesting in the Aylesbury Dairy, just behind the organ. This dairy is designed to illustrate the most improved methods of separating cream from milk, and of butter making. The arrangements are most complete, and the dairy will be at work during the Exhibition.

THE WEST COURT.

The West Court is, in point of area, second only to the North or Main Court of the Exhibition. The character of the exhibits placed in this section gives to the court a more sombre appearance than that characterising the other courts, but the wonderful collection of objects of interest gathered together here will make this department fully as interesting as any other section of the gigantic show. This portion of the building is mainly reserved for machinery in motion, coal and lead mining produce, sanitary appliances, and the exhibition of workmen's models. The result of the undertaking must have exceeded the most sanguine expectations of the promoters of the Exhibition, for it is not too much to say that as regards machinery there has never in Newcastle, and perhaps seldom in this country, been brought together so complete a collection of fine exhibits. From ponderous engines to the most minute model there are specimens of machinery used for almost every purpose, and when the whole to which motive power is attached, are at work, a most effective scene is produced. The coal and lead mining produce are an unique collection, and undoubtedly surpasses anything of the kind which has ever been got together in this country. Situated as Newcastle is in the very centre of the great northern coal field, the general public, perhaps, because no exhibition of this kind has been previously attempted in the district on a like scale, know comparatively little of the manner in which coal and iron are procured from the mines. A careful inspection of the exhibits of this class in the court, in addition to a visit to the coal and lead mines in the North Gardens, should give the public a capital insight into the manner of sinking mines, "getting" the minerals, bringing them to bank, and shipping them at the staithes, as well as a thorough knowledge of the uses to which the produce is put. Alongside of these exhibits are to be seen almost every appliance and invention for securing greater safety to the miner in the pursuit of his hazardous employment. The decision of the Executive Committee at an early stage of the project to encourage workmen's exhibits was a wise one, and its wisdom has been abundantly manifested by the result, as the really splendid collection of

artisans' models bears evidence. The West Court takes the form of a main court, an annexe on the western side of the main avenue, and a small T-fall or annexe on the eastern side of the section immediately adjoining the North Gardens. The general plan followed has been to apportion the heavy machinery in motion to the centre and southern portion of the court, and to place mining exhibits in that portion of the section immediately adjoining the North Court.

MINING PRODUCE.

As mining is the initial word in the description of the character of the Exhibition we will first glance at the stands devoted to the display of mining produce. In entering the court from the north, the visitor is struck by the appearance of the stand of the world-renowned firm of Messrs. Bolckow, Vaughan, and Co., of Eston Works, Middlesbrough, which is, perhaps, the finest of the exhibits in the court. The stand is a platform 33 feet by 16½ feet, and 3 feet high, a pyramid rising from it to a height of 12 feet. A blast furnace, with hot blast, stoves, &c., complete, made to a scale of three-quarters of an inch to the foot, occupies the summit of the pyramid. The furnace has a bosh of 24 feet diameter, a crucible 10 feet, and throat 15 feet diameter, the whole height of the furnace being 93 feet. Its yield of Cleveland pig iron is 520 tons per week. A furnace of similar construction for the manufacture of hematite pig iron, but only of 72 feet in height, produces 1,000 tons per week. A large steel plate, 21 feet long by 7 feet wide, of 11½ inches thick, and weighing two tons, is placed in the rear of the model. Round the bottom of the platform are shown samples of all the minerals used in the manufacture of iron and steel, such as coal and coke, limestone (both mountain and magnesian), and Cleveland ironstone from Eston mines. When in a raw state this stone contains 30 per cent. of metallic iron, and when calcined 41 per cent. Spanish hematite ores are also shown containing 50 per cent. of metallic iron used in the manufacture of Bessemer pig iron; Spanish manganiferous, containing 17 to 23 per cent. of manganese, for making spiegeleisen; and manganese ores from Chili and the Caucasus with 53 per cent. of manganese, used for the manufacture of ferromanganese. Large obelisks of Cleveland ironstone, weighing two tons, are placed at two corners of the platform, and large pyramids of limestone are placed at the other two corners. Above the samples of the minerals are some splendid specimens of the various kinds of iron obtained from them. Several ingots are exhibited in Siemens-Martin, Bessemer, and basic steel, in the various sizes required for the manufacture of rails, sleepers, plates, angles, bulks, girders, &c. A splendid collection of ironstone, limestone, marble, &c., has been got together on the imposing stand of Messrs. Pease and Partners, Limited, and their display will doubtless constitute one of the features of the court. There is first of all a huge block of ironstone from the Upleatham mines of the company. The block, which is from the main winning, is 4 feet 2 inches square at the base, 3 feet 4 inches square at the top, and 11 feet 2 inches in height. It is one block, and represents a complete section of the seam as wrought at Upleatham mine. This bed of ironstone is found in the most favourable conditions as regards thickness and quality in the Eston and Upleatham mines. There is also shown a splendid specimen of carboniferous limestone from Messrs. Pease and Partners' Weardale mines. It is exclusively used as a flux in the manufacture of pig iron. Their chief quarries are Broadwood, Frosterley, Bishopley, and Rodgerley. The formation, which is of marine origin, extends over large areas and is 72 feet in depth. The celebrated Frosterley marble, of which beautiful specimens are on view, is won from the quarries of the company. Specimens of coke made in Simon-Carvè ovens; by products obtained in the manufacture of coke; fire clay and articles manufactured from it; and ganister stone and bricks are all objects of interest shown by the company. The Butterknowle Colliery Company, of Darlington, have an interesting display of the products of their pit, including household, steam, and manufacturing coal. They also show a sample

of disintegrated coke and coal, as well as Butterknowle coke for foundry, smelting, and other purposes. The machine used in the process of disintegration is Carr's patent disintegrator. The well-known Wearmouth Coal Company, Limited, whose mine is celebrated for the completeness of its fittings and the general excellence of its management, show models of pit cages, spouts, and patent screens used by the company. On their stand there are also photographs of the colliery, lime works, cages, &c. Samples of their Brancepeth coke are shown by Messrs. Strakers and Love, of Brancepeth Colliery. The owners of the Victoria Garesfield Colliery, Durham, are represented by a handsome glass case, containing bricks, disintegrated coal for coke-making, and ground fireclay for making bricks. The Harton Coal Company's exhibits are worthy of inspection, and there are also samples forwarded by Mr. Cochran Carr from South Benwell Colliery, and by the South Durham Coal Company. There is nothing neater amongst the mining exhibits than the model of the Nitshill Lesmahagow Colliery, N.B. The colliery, the pit heap, the engine-house, the railway, and other surroundings are all shown, with brass engines and boilers, and the polished table on which the model is erected makes a most curious and interesting display. The company also show a splendid pyramid of cannel coal. Messrs. Young, Dance, and Company, of this city, have brought excellent specimens of East Pontop and East Castle first-class gas coals and coke. They also have on exhibition full sections of the Tyne Boghead cannel seam. One of the chief attractions in the mining section is the display of Messrs. Bell Brothers, of Middlesbrough. The firm show their mining drill, which is a hydraulic machine for drilling holes for blasting in Cleveland ironstone, and is in successful operation at the Lumpsey mines. The machine drills 80 and sometimes 100 holes each 4 ft. 6 in. deep and 2½ inches in diameter in a single shift of eight hours, producing 170 tons of ironstone. On another stand the firm show a coal wedge, intended, if possible, to do the work now done by powder in collieries. It has been in practical operation at Tursdale for several months. The coal working machine is an improvement upon the old system of trough and rake washing. It consists of a long semi-circular trough of iron hung at one end so that it can be lowered and the deposited sediment washed away, as soon as the space behind the steps has filled up. In these days when our first-class seams are rapidly disappearing the invention is of much value. The owners of the Backworth and West Cramlington collieries also have an attractive stand on which they show specimens of tubs and immense blocks of coal. Adjoining this stand is that of the Bothal West Hartley, and Ashington Collieries, with samples of low main coal from Ashington, and exhibits from the well-known original Hartley steam coal seam, which is known wherever coal is used. Messrs. Joseph Cowen and Co., of Blaydon Burn, Blaydon-on-Tyne, besides their display of all kinds of bricks and tiles, have specimens of the well-known Garesfield coke. On the stand of Messrs. Hedley Brothers, of South Moor Colliery, there are samples of coal from the Morrison Pit, with contributions from the Brass Hill, Low Main, and Hutton Seams. The coal washing machine of Mr. R. Robinson, Howlsh Hall, Bishop Auckland, will attract attention. A column of water passes through a pipe at the bottom, the coal is discharged into a cone-shaped vessel, and being washed, discharges itself over the top of the machine by means of perforated spouts, the dirt passing to the bottom of the cone. One man can with this machine wash about 400 tons of small coal per day. A model of Jameson's patent coke oven is shown by the Jameson's Patent Coke Company, and constitutes an attractive exhibit. A difficulty in the coking process hitherto has arisen from the in-leakage of air at the oven bottom, and the closing up of the small suction orifices in the false bottom. Both of these difficulties have been successfully surmounted. The process aims at the recovery of by-products in the manufacture of metallurgical coke, these being oil, ammonia, and burning gas. The celebrated firm of Messrs. John Bowes and Partners, in a beautiful glass case, also contribute to the splendid collection of coke exhibits. Messrs. Locke, Blackett, and Co., a well-known

Newcastle firm, have an attractive stand, which takes the form of a pyramid of lead in pig sizes, lead pipes, and sheets, white and red lead used for paints, silver extracted from the lead, and other products obtained by the firm. The mode of working a seam is capitally illustrated by the device constructed by the Elswick Coal Company. By means of huge pieces of coal and shale they have formed a perfect section of a seam in the workings of a pit. A lamp burns at the place, stone is removed, and working tubs and other gear are also in the "workings." The company have also brought specimens of their coal, which is so largely sold in this city.

HAULAGE, TUBS, &c.

One of the most attractive stands in the whole court, and one that is sure to attract crowds of spectators, is that erected by the South Derwent and West Shield Row Collieries, Annfield Plain. It is intended to give, and does give, an accurate idea of the haulage system employed by the company. The model is 50 feet long and 5 feet wide. Tramways, tubs, and other appliances are brought into requisition, the haulage system being effectually worked by means of an engine some distance away. The patent fork or rope gripper, the property of the company, is used. In going round the curve the wagons run free from the rope, and then, after taking a straight run again, they are once more attached to the rope overhead by means of the fork named, which is automatic. In the east annexe of the court will be found an interesting model of the improved detaching hook made by Messrs. S. Oldham and Son, Durham, for obviating over-winding. The hydro borer of Mr. C. Burnett, Hartlepool, is well worthy of inspection. The practice hitherto has been to use the ordinary screw drilling machine, which in boring long holes has necessitated frequent withdrawals of the drills. This is obviated in Mr. Burnett's machine by the use of water, which is delivered at the end of the drill by means of a pump attached to the drilling machine. In the east annexe, Messrs. Crawshay Bros., of Cyfarthfa Works, Merthyr-Tydvil, have a fine assortment of iron and steel products, Bessemer steel, tin stampings, &c. Immediately adjoining the North Court, Messrs. Wm. Cook and Sons, of Glasgow and Sheffield, have a considerable display of iron pit tubs, smiths' forges, a seven feet saw, &c. The firm show Carr's patent roller or pulley for collieries and inclines, for which it is claimed that it obviates to a great extent the cutting of the rope and the roller, besides saving 80 per cent of oil. Carter's wagon coupling is another speciality exhibited by the firm, and will be of interest to railway men. The Grange Iron Company, Limited, Durham, have a fine stand in the Main Court, on which are shown a coal screen model, their double-acting rope pump for pits or other purposes, model of a pit heap with their steam brake and automatic gear, model coal-getter (an interesting exhibit), electric lighting machinery, double metre valving gearing, jack engine, &c. Mr. Henry Simon, of Manchester, has a stand illustrating the Simon-Carvē coke ovens for continuous recuperation of heat and recovery of tar, ammonia, benzol, &c.

SAFETY LAMPS.

A mining exhibition would be incomplete without a collection of miners' safety lamps, and the specimens which have been got together give an admirable idea of the history of the safety lamp. There are specimens of the latest improvements in pit lamps of all principles. Of great interest will be the stand of the North of England Institute of Mining and Mechanical Engineers, not far from the entrance to the court. Here are arranged seventy-five specimens of lamps of about sixty different kinds on the Davy, Clanny, Stephenson, and other principles. There will be a relic of the old days preceding the birth of the safety lamp in the steel mill and flint formerly used for the purpose of giving light in fiery mines. This was invented about 1753. There is also on this stand a pick used by H.R.H. the Prince of Wales for hewing coal in Houghton-le-Spring Pit on May 18, 1857. The safety lamp shown by the Clifford Lamp Co., of Sheffield, is an extremely simple invention. The main peculiarities of the lamp are the admission of air in an oblique or tangential direction; the use of gauges of perforated

"Sandwich metal," the outer surface being fusible at a low heat; and the use also, in lamps with a long outer glass, of an inner bell glass attached to a metal chimney. Mr. James Laidler, of Durham, has also a fine assortment of pit safety lamps. These lamps include many novelties, the exhibitor holding a number of patents in this branch of manufacture. Worthy of notice is Laidler's No. 9 patent lamp, with a moveable steel bonnet, locked with Laidler's patent cam lock. The Marsault lamp has also a patent lock fitted to it. The Cuvelier patent lock, though popular in France, is not so well known in this country as it should be. Specimens of coal from the Londonderry mines, in the county of Durham, are on view opposite the stand of Messrs. Bolckow, Vaughan, and Co. The Stella Coal Company work coal from six different seams, the mines having been worked from time immemorial, the earliest record being 1350. The company manufactures coke, and has a speciality known as Ramsey's patent condensed coke, bright, hard, and close grained. A model of Messrs. B. Samuelson and Co.'s coke ovens at East Hedley Colliery; the stand of the Protector Lamp and Lighting Company, Eccles, Manchester; specimens of products from Shiremoor Colliery; and the stand of Messrs. C. J. Lampen and Co., Wakefield, are all interesting additions to the splendid display of mining machinery and produce.

MACHINERY.

It is impossible to describe in detail the almost endless collection of machinery which has been brought together in this section of the Exhibition. The display of manufacturing and other purposes will also compare favourably with similar collections at most shows of the kind. The motive power for the driving of the machinery in motion in this court is produced by four of Messrs. Davey, Paxman, and Co.'s boilers, one boiler by Hornsby, of Gratham, and one of Toward's genetic boilers. Close to the boilers is placed a fly wheel, 15 feet in diameter, for driving the shafting in the court. The fly wheel is driven by a Robey engine, and constitutes in itself an attraction in this department. Messrs. Garrett and Son, Leiston, Suffolk, have in their semi-portable high pressure non-condensing steam engine a huge exhibit of imposing appearance. These engines are well known for economy in fuel and regularity in rotation. The construction has been materially improved since the exhibitors first showed this class of compound engine. Messrs. J. H. Holmes and Co., electrical engineers, Newcastle, who have been engaged in the lighting of a portion of the buildings by electricity, have an attractive stand with their machines in action. They show a 1½ h.p. "Otto" vertical engine driving a "Castle" dynamo. They also have plant for electric lighting of steamers, &c., requiring about sixty incandescent lamps, and several other of their machines. Mr. J. W. Swan, the famous electrician, now of Bromley, Kent, and late of this city, shows every size and shape of the Swan incandescent lamp. There is also shown the first incandescent electric safety lamp, made by Mr. Swan in 1880, for use in coal mines. Swan's portable electric safety lamps are also on exhibition. These are for use in explosive and noxious atmospheres, under water, or where ordinary lights would be unsafe. Swan's fire-damp indicator, surgeons' and dentists' lamps, and lamps for photographic purposes are shown in profusion. Some heavy machinery is on the stand occupied by Messrs. Walker Brothers, of Wigan, two fine pieces of mechanism being a couple of the firm's patent air compressing engines in motion. They also have one of their ingenious hauling engines for working endless rope and other systems of hauling. The firm make a speciality of the manufacture of ventilating fans, specimens and models of which are on view. Adjoining the last stand is that of Messrs. Harfield and Co., of Blaydon and London. Their patent double windlass, which allows each cable to be worked independently of the other, is a novelty. They have also a handsome horizontal engine, with quick speed warping drum, suitable for a yacht, as well as their noiseless hydraulic winches without an accumulator, for passenger steamers. In the east annexe of the court Mr. John Kirkaldy, 40, West India Road, London, has on his attractive stand

fresh water distillers and evaporators of ingenious construction. The circulating discharge gives up its vapour, and the distilling efficiency is doubled by the condensation of this, with, of course, corresponding economy in fuel. They have a model of a compound marine engine; as well as other exhibits, and photographs of machinery, which the exigencies of the Exhibition space would not permit being placed in the court. Mr. J. A. G. Ross, civil, mechanical, and consulting engineer, 46, Grainger Street, Newcastle, has an exhibit which will arrest the attention of all. It is an original model of the engine made by James Watt according to his patent of 1781. Messrs. Elliot and Jeffrey, Cardiff, show patent cylinder rings intended to reduce friction to a minimum; Messrs. Kirk and Co., Stoke-on-Trent, have on view Thompson's multiple compensating piston; and the Low Bridge Engineering Company, Newcastle, have a fine collection of shafting, pulleys, &c. Mr. T. E. G. Marley, of Workington, shows drawings of Ford and Moncur's patent regenerative hot blast firebrick stoves for blast furnaces; Messrs. Menzies and Blagburn, Newcastle, have a design for a steamer to carry 1,000 tons of sewage for the Metropolitan Board of Works; and Messrs. Cowans, Sheldon, and Co., of Carlisle, show photographs of their machinery. Considerable space has been allotted to the well-known firm of engineers and boiler makers, Messrs. Smith Brothers and Co., of Kingston Engine Works, Glasgow, and this stand will be one of the attractions of the section devoted to heavy machinery. The firm claim for their horizontal engine superiority of workmanship and material, the engines being also constructed so as to give a large indicated horse power on a small consumption of fuel. Their circular saw is specially adapted for cutting cold iron or steel plates up to six inches thick, and is suitable for cutting built girders, beams, angles, and pipes up to 12 inches in diameter. The lever punching and shearing machines are made of great strength to the newest and most improved designs. The punching slide receives its motion from a lever worked by a cam formed so as to cause the punch to descend slowly through the plate and ascend quickly to the top of the stroke, completing the operation in half a revolution of the main shaft and then remaining still when full up for the remaining half revolution, allowing sufficient time for the plate to be moved for punching the next hole. The firm of Messrs. Westgarth, English and Co., of Middlesbrough, have an admirable collection of photographs of their machinery on the west wall of the court. A huge exhibit is the large soap boiling pan used in the manufacture of "Sunlight" soap, by Messrs. Lever Bros., at Warrington. The pan holds about sixty gallons of liquid soap. The Canada Works Engineering and Shipbuilding Company, Birkenhead, for whom Mr. J. H. Fenwick, Exchange Buildings, Newcastle, is agent, show their fresh water distiller and other interesting exhibits. Mr. W. Cowan, Edinburgh, is the exhibitor of the Syphon Liquid Meter; and Messrs. Wormald and Company, Gateshead, show short lengths of piping coated with non-conducting composition. Messrs. M. Glover and Co., special machinists, Leeds, have an attractive stand, on which they show working models of their patent firewood splitting and bundling machinery in a glass case. Glover's improved patent saw-sharpening machines are well known, not only in England but on the Continent and in America. The eminent firm of Messrs. Clarke, Chapman, Parsons, and Co., Gateshead, have a characteristic stand. They exhibit the patent "Clarke-Chapman" steam windlass, suitable for a steamer of about 4,500 tons, and fitted with this firm's patent spring riding brakes for obtaining better command of cables in veering and safety and ease in riding at anchor in heavy weather. The success which has attended the introduction of this patent windlass may be best estimated from the fact that, during the past three years, over 450 have been fitted to steamers and sailing ships, among which are some of the largest vessels afloat. They also have on view their well-known patent steam steering gear. This has been designed and successfully fitted for working with the full main boiler pressure of 160 lbs. per square inch.

without undue wear and tear of the engine, and by thus avoiding the use of reducing valves removing an element of uncertainty and unreliability from this very important part of a steamship's outfit. Their steam warping capstan is largely used for yachts and light-draught river steamers. The engine being mostly under the capstan gives the whole machine a very neat appearance, and at the same time all needful accessibility is afforded for maintaining the working parts in good order. The horizontal ship's steam winch is a fine specimen of a strong, well-finished, cargo winch, into which every improvement has been introduced of which long practice has tested the efficiency, and though not put forward as embodying any points of novelty, represents a large manufacture carried on by the makers. During the past seven years Messrs. Clarke, Chapman, Parsons, and Co. have turned out over 6,000 steam winches, showing the appreciation their work has received from a very large circle of users. A very unique and effective trophy is arranged at the back of the stand, and ingeniously designed to answer the purpose of an office. The specimens of flanged boiler plates have all been turned out by the hydraulic plant in the company's boiler yard. On this stand is also shown a small engine and dynamo of this firm's special make, similar in general construction to those so effectively on view in the electric machinery shed, giving lights to all the courts of the exhibition. The small specimen on the stand is shown at work, and instead of being fastened to relatively costly foundations, as would be the case in an ordinary engine, this is at work while only hung in mid air by a couple of wires from the roof, its steadiness under these circumstances being a remarkable testimony to the perfect balance under which the engine works. M. Louis Gonin, engineer, Lausanne, illustrates by drawings new hydraulic appliances in use on the Continent.

PRINTING MACHINERY.

Although the display of printing machinery is practically confined to two great Newcastle firms, there will be shown specimens of the latest and most improved machines for printing, lithographing, and other work, and these stands will constitute one of the attractions of the whole exhibition. Messrs. R. Robinson and Co., wholesale stationers, paper rulers, bookbinders, letterpress printers, &c., who are the official printers to the Exhibition, and the sole contractors for the official publications, have filled the space allotted to them with machinery, which must be regarded with interest, not only by printers, but by the public generally. A space of 960 feet was allotted to the firm, but they found this totally inadequate to show a representative group of machinery in motion, and have selected those machines most likely to be of general interest. Letterpress printing is executed upon a quad demy cylinder machine, fitted with patent self-flyers and Hoyer's patent counter, for accurately registering the actual number of impressions, manufactured by Messrs. A. Seggie and Sons, of Edinburgh. Similar work, such as cards, envelopes, note heads, memos, invoices, &c., is done on a foolscap folio arab platen, by Josiah Wade, of Halifax, working at a speed of 1100 impressions per hour. Lithographic printing in block for commercial purposes and in colour, such as show cards, reproduction of water colour drawings and oil paintings, is performed on a double demy cylinder machine, by Messrs. A. Seggie and Son, of Edinburgh. Paper making, tally making, relief stamping, account books, &c., are also done by this old-established firm. Milner's safes, a railway ticket-dating press, specimens of work, &c., are also placed on this stand. Mr. Andrew Reid, of Newcastle, the well-known printer, engraver, lithographer, &c., has spared no expense at his stand. He will show the latest improvements in printing, folding, stitching, pressing, and cutting machinery for producing publications and bookwork of every description. Mr. Reid occupies about 1,215 square feet of space. Two ponderous machines are the letterpress machine by Messrs. Miller and Richard, and the lithographic machine by Mr. W. Greaves, of Leeds. Greaves' quad-crown lithographic machine will command curious interest. On it will be produced beautiful specimens of colour work from the stone. A "Godfrey" patent gripper platen machine, by Messrs. Furnival and Co., Stockport,

will do all kinds of jobbing work. The Martini folding machine, invented by the maker of the famous rifle of that name, will be regarded with great interest. Only three machines of this particular size, we understand, are in existence. The "Smyth" book-sewing machine, an American patent, is also a wonderfully clever piece of mechanism. Messrs. J. Richmond and Company's patent index-cutting machine, which was specially obtained by the firm for Reid's Patent Index Ready Reckoner will be a novelty. This machine will cut indices in size from a large ledger to a small pocket box. The machinery of the printing office will be driven by a "Beck" gas engine. On the opening day, from three in the afternoon till eight in the evening, Mr. Reid will print, on the Miller and Richard's machine, a *fac simile* of the first number of the *Newcastle Chronicle*, published on March 24, 1764. This *fac simile* will be printed every day during the time the exhibition is open, and will be on sale at the *Chronicle* stand, facing the orchestra, in the North Court. The Tyne Printing Company have also a small Cropper machine in the West Annex.

PREVENTION OF OVER-WINDING.

Mr. W. H. Massey, of Twyford, Berkshire, shows a half size model of his clever automatic gear for the prevention of over-winding. An attractive stand of heavy exhibits has been got together by Mr. George Ridley, of 38, Side, Newcastle, including crucible steel castings, his patent boring machine, "Fenwick's" patent railway coupling gear, &c. The air spring pressure gauges shown by Mr. A. Allan, of The Valley, Scarborough, is a novelty which should not be missed. By the double wedge detaching hook of Mr. John Hodgson, of Edmonson, it is claimed that re-attachment can be effected in fifteen minutes from the moment of over-winding.

LOOMS AND VARIOUS EXHIBITS.

Looms in motion always attract crowds at exhibitions of this kind, and this will undoubtedly be the case around the stand of Messrs. Henderson and Co., Limited, of Durham. They have a loom in motion for weaving five-frame velvet pile, Brussels carpetings, Royal Wilton carpets, Weardale Art carpet, Burmese Art carpet, and other fabrics. The famous Darlington firm of Henry Pease and Co.'s Successors also have a loom for the manufacture of various materials. A vertical steam engine with improved governor and vertical cross tube boiler, horizontal steam engine, and other machinery is displayed in the space occupied by the Albion Iron Works Company of Rugeley. Mr. J. A. G. Ross, of Grainger Street West, Newcastle, is the local agent for the Midland Steam Boiler Inspection and Assurance Company, who exhibit amongst other interesting things apparatus and models illustrating the subject of boiler explosions, used by the company at inquests or similar inquiries. The models show the boilers before, and fragments after explosion, and by many of the specimens mournful recollections of terrible disasters in this locality will be brought up. The association serves a great and useful purpose. The Dunston Engine Works Company have on their stand Archer's patent self-holding hand steering gears, with chain and rope attachments; Archer and Wilson's patent apparatus for relieving the strain on towing ropes, chains, &c., when a vessel is being towed or riding at anchor. Messrs. A. Shanks and Son, of Dens Iron Works, Arbroath and London, are the makers of a triple expansion surface-condensing marine engine, with cylinders of 10, 15, and 24 inches diameter respectively, by 18-inch stroke, fitted with all the latest improvements. Mr. Joseph Donkin, of West Grainger Street, Newcastle, general agent, has a varied and choice assortment of machinery. He has at his disposal a space of not less than 2,230 feet. He shows articles exhibited by Messrs. Allday and Onions, including Root's blowers and engines combined; Smith's metal hearths, forges, fan-blasts; Besford's samples of steel in various stages and processes, and tools of the best quality. He also displays a circular saw of 9ft. 9in. in diameter, and articles supplied by the well-known firm of Mr. Joshua Heap, Ashton-under-Lyne. The latter include pipe-screwing machines and the most recent bolt and nut machinery. He also shows on the stand the famous wood-working machinery manufactured by Sagars, of Halifax. A curious and interesting collec-

tion of diving apparatus has been got together by Mr. R. Applegarth, of London, including air pumps, diving dresses and hose, speaking apparatus for communicating with the diver under the water, submarine lamps, &c. Further additions to the admirable collection of electric lighting machinery are made by Messrs. Walker and Sidney F. Oliver, of this city. They are represented by their dynamo-machines from ten lighters to four hundred of their special form of arc lamps for colliery and other purposes, incandescent lamps, and complete shaft and engine plane colliery signals, shown in action. Adjoining the South Court is the large stand occupied by the eminent firm of Messrs. Tangye, Limited, of Birmingham and Newcastle. Most of Messrs. Tangye's machines are too well-known to need description. On the stand there is Tangye's horizontal steam engine with variable expansion gear on Meyer's principle, pumping engines, gas engines, gas forging hammer, and specimens of most of the machinery for which the firm is so justly celebrated. A fine exhibit is the double horizontal roller mill for middlings shown by Mr. C. Hopkinson, of Retford. Two large weigh backs sunk into the ground, similar to those used in market places, factories, &c., for weighing carts, horses, and goods, have been fixed by the firm of Messrs. W. and T. Avery, of Birmingham. These machines will be in full working order, and besides the firm show a large variety of smaller machines for weighing purposes. Coal and rock boring machines, safety powder box, and other articles used in mines are placed on the stand of Messrs. Proctor and Son, Newcastle. Mr. J. T. Calow, of Staveley, Chesterfield, is represented by a model of safety apparatus applicable for wire skeats without injury to the same. The apparatus does not come into action unless the rope breaks, and is brought into play solely by the law of gravitation. Messrs. R. Wilson and Son, of Bishop Auckland, exhibit their patent wrought steel continuous web bore rods for boring long holes before the face, as required by Government, as well as their compound drill for use where there are heavy pressures of water, and an attractive collection of boring and mining tools. A fine stand is that occupied by Messrs. Fielding and Platt, of Gloucester, on which the firm show their duplex pumping engines, pair of belt-driven hydraulic pumps for working hydraulic machine tools, lifts, presses, &c.

GLASS-BLOWING AND DOMESTIC MACHINERY.

On Stand 46, Messrs. Liddle, Henzell, and Co., Limited, Ouseburn Glass Works, Newcastle, show, at work, one of Teighman's latest sand blast machines (Matthewson's patent), which, amongst other matters, is used in the final process of printing local views on various glass articles. This will enable visitors to carry away many pleasing souvenirs of the Exhibition, including the Newcastle bridges, the Central Railway Station, the Exhibition, Jesmond Dene, Old Tyne Bridge of 1771, Art Gallery Buildings, the Cathedral, &c. The little folks will hail with glee the production of Uncle Toby and his nieces and nephews, a group which the pages of the *Weekly Chronicle* have made so familiar. This group will be transferred to glass. Along-side talented glass engraver is at work, and further decorations will be added at the pleasure of the purchaser. To Uncle Toby's countless nephews and nieces this stand will be a rallying point, for here the members of the society can have their names and numbers in the Big Book of the society placed beside the production of the Uncle Toby group. The firm also propose to show specimens of the work of the sand blast process on granite blocks, lamp and gas globes, tablets, &c. Mr. W. Row, aerated water manufacturer, of Newcastle, has on view the complete plant of Galloway's machinery for making the various syrups, generating and purifying the gas, and mixing and bottling the waters necessary in the manufacture of aerated mineral waters, and which will fill 50,000 bottles per day. Messrs. Barnett and Forster, of London, mineral water manufacturers, have also a splendid collection of machinery used in the manufacture of aerated waters. Messrs. John Telfer and Sons, tobacco manufacturers, Clayton Street and High Friar Street, Newcastle, show on their stand the manner in which tobacco is cut and spun,

weighed and packed, and show the latest machinery used for this purpose. Near to this stand is that occupied by the famous Wheeler and Wilson sewing machines, and here will be seen machines capable of doing every class of work from the finest muslin up to leather. The No. 2 machine for light manufacturing purposes will run with ease at the high speed of 3,000 stitches per minute. Mr. Wm. Patterson, 71, West Grainger Street, is the manager of the Newcastle branch. The Singer Manufacturing Company, of 16, Grainger Street West, Newcastle, occupy a fine stand with about forty samples of their sewing machines. They have a stand with a frontage of 48 feet, and exhibit machines for doing every class of plain and fancy stitching, from the finest muslin to the thickest leather and cotton belting. Most of the machines made by the company are too well known to the public to require detailed description. An eyeletting machine, specially adapted for making eyelets, and a machine for sewing all kinds of carpets, doing the work of about ten hand sewers, are, however, particularly worthy of mention. An interesting novelty, too, is a special buttonhole machine for making perfect button-holes in boots and shoes.

A CLOTHING FACTORY.

A complete revolution has been brought about in the making of men's and boys' clothing by the application of machinery for the purpose. This will be practically illustrated by Messrs. Bainbridge and Co., of Newcastle and Leeds, at their model clothing factory, which occupies a prominent position in the court. Their stand displays the process of manufacture of juvenile clothing from the web of cloth to the finished garment, and Messrs. Beercroft and Co., of Leeds, clothiers' engineers, at their instance exhibit in action the latest and most effective machinery now in use. The cutting machine will, without difficulty, cut through 120 thicknesses of brown cotton lining or 140 thicknesses of cloth, the knife used being an endless ribbon which travels at the rate of 4,000 feet per minute. The sewing machines exhibited are of the most improved and effective kind. After leaving a sewing machine, the edges are sewed and pared by the paring machine. The suits requiring braiding are next braided by the machine for that purpose, then bound by the binding machine, the button holes being next made by the button hole machine. The sleeves machine is next brought into requisition, and the clothes are then pressed by the wonderful pressing machine, the successor of the old "tailor's goose." All the machines are driven by the latest system of applying motive power to sewing machines.

REFRIGERATORS.

The strides made in the methods of importing dead meat to this country have been rapid of late years. The importation of foreign meat promises to greatly change, if not to revolutionise, the meat trade of this country; and in view of this, the stand of Messrs. Siebe, Gorman, and Co., of 137, Westminster Bridge Road, London, will be regarded with not a little interest. The firm has been engaged in the manufacture of refrigerating machinery for more than thirty years, and exhibits a dry-air refrigerator and cold storage room such as are now largely in use for the freezing and preservation of perishable goods. The machine is constructed under the patent of Mr. T. B. Lightfoot, M.I.C.E., London. It consists of a square wood house with double partitions, the space between the latter being filled with charcoal. Air chambers are provided, and by means of these the air is exhausted, and the meat inside may be conveyed almost any distance by sea or land in a perfectly fresh and sweet condition.

WOOD-WORKING.

A truly remarkable piece of machinery is the international joiner and cabinet-maker on the stand of Messrs. Hunting and Co., Bath Lane, Newcastle. The machine is invented and patented by Mr. Andrew Telfer and Mr. Edward George of the above firm. A better combined wood-working machine we have not seen, its utility, compactness, and adaptability for economising shop room being all that can be desired. The tables are only 6 feet long by 2 feet wide, and it is adapted to do all the most important work required by joiners and cabinet-makers,

planing, jointing, bevelling, stop chamfering, squaring, moulding, rabbitting, morticing, grooving, sawing, and a great variety of work. A great feature in this unique machine is the ease with which it can be altered for the different kinds of work. Of interest to builders and persons in the timber trade should be the stand of Messrs. John Anderson and Co., saw mill engineers, of Dean Street, Newcastle. The firm's automatic dove-tailing and variety wood working machine was patented in 1885, and since that time has become deservedly popular, and its capability of turning out clean and accurate work has become recognised. A special feature in the machine is the universal carrier, which is so constructed that all sizes of dove-tailing can be done in it up to $2\frac{1}{2}$ inches thick. The machine can be had for dove-tailing only, or by attachments will perform dimension sawing, planing, mouldings, morticing, tenoning, tracing, and other kinds of work.

NAIL-MAKING.

At the corner of the West and South Courts visitors will find in the exhibit of Messrs. W. Galloway and Co., the Tyne Nail Works, Gateshead, one of the novelties in the way of exhibits, viz., cut nail machinery in motion. Those whose acquaintance with nail-making has been gathered from a peep into the little forges of some of the hand nail-makers, who at one time worked in almost every considerable country town, will certainly be surprised at the marvellous change brought about by the application of machinery to the process of nail-making. There are no creaking and asthmatic bellows, there is no fire shooting up its little tongues of flame, no glowing rod of iron sending out a shower of sparks as it is beaten by the quick and deft blows of a swarthy son of Vulcan, who, rapidly as he works, can only manage to fashion a few nails in a minute; but rapidly-revolving machines, which fashion the nails from strips of cold steel or other metal at the rate of several hundred per minute, all the manual labour required being that of a mechanic to grind and set the cutters and dies and girl attendants to supply the strips to the machines. One of the three machines exhibited is cutting flooring brads, a kind of nail which is completed by the single operation of cutting off, the projection forming the head being left on the strip at one side, and then at the other, as at each successive stroke of the cutters the table, by which the strip is fed into the machine by the action of a weight, swings from side to side. This machine, although very powerful—capable of cutting four-inch steel nails one quarter of an inch thick—does not make much stir. It simply seems to nod its head up and down at the rate of about 240 times a minute as it swallows strip after strip, which it guides into its mouth by successive pats of its swinging arms. Alongside of it is a machine of quite a different type, which is making half-inch tacks at the rate of nearly 300 per minute. It is a much more complicated arrangement, as it has to perform several distinct operations before it furnishes, out of a ribbon-like piece of steel, some hundreds of tacks. In the first place, it cuts off a plain, wedge-shaped piece from the strip, which is carried down by the cutter, being prevented from falling away by the action of a spring when the cutter has reached its lowest point. The blank is immediately in front of a grooved steel die, and just before the cutter begins to ascend again a little finger seizes hold of the blank near the point, and retains it in position until a moving die, the counterpart of that fixed in against which the blank is resting, moves up and squeezes the upper part of the blank into a round shape. The whole of the blank is not, however, in front of the dies, as it has been cut off and delivered so that about an eighth of an inch projects beyond the edge of the die. This projecting part is not therefore compressed at all, and retains its original shape, the blank being thus squeezed into something like the shape of a crutch handle or T shape. The dies still keep their firm grip of this partially shaped blank, and another die is pressed up against the projecting portion of the blank, which is flattened out into a properly shaped head. The dies open out again, and the finished tack falls down a spout into a pan. All this is done with astonishing rapidity, and, so long as the hardened steel cutters and dies retain their form under the severe strains to which they are subjected, with mar-

vellous precision, all the attendance the machine requires being that of a girl perched on a stool in front of it, who, with a holder formed of a broom handle and a pair of steel jaws, feeds in the strip to the machine, in doing which she has to turn over her wrist exactly in unison with the stroke of the cutters, or about 300 times a minute. Even this operation of feeding is, in an ordinary way, done by machinery (which is, however, scarcely suited for exhibition), and all the girl has to do is to attend to several machines by merely inserting the strip and holder into a tube which turns over automatically. This tack machine on exhibition strikes us as being, as it were, instinct with life. Its movements are so varied and so rapid that it gives one the impression of being very fussy, an impression scarcely conveyed by the attendant, who sits turning over the "claw shank" in a way which, but for its manifest rapidity, might almost be described as leisurely, long practice having enabled her to do it apparently without an effort. On the opposite side of the stand is a much more massive machine, but as its functions are practically the same, we need not describe it at length, although it will be at once seen that there are considerable variations in the details. This machine makes headed nails of all descriptions, but is more especially designed for making nails with large heads. At the time of our visit it was only making the clasp nails ordinarily used by joiners, but will, as it is worked, proceed to make coopers' clout nails and slaters' nails with large heads. By stamping the dies the registered brand of the firm, "Tyne," is impressed on either the shank or head of the nail. The other machine in the stand is a grinding stone of peculiar grit, which admits of ridges being left on it by the action of a turning tool or "rasing bar," which ridges are in some cases not over one-sixteenth of an inch thick, and are used for grinding out the grooves in the hardened steel dies. It is difficult to convey a clear account of the action of these machines, but those who are curious this way will have no difficulty in understanding it, on reference to the collection of blanks in the different stages shown by the firm on their counter, along with the cutters, dies, &c., used and the various kinds of strips operated on. Messrs. Galloway have paid special attention to making steel nails, and exhibit steel nail sheets and strips, from which can be seen how tough and reliable is the material they use, and the fact that for three years past they have supplied the Royal Dockyards with cut steel nails, they must have machinery capable of enabling them to turn out nails with the exactitude required by Admiralty specifications. They also show, on their counter, an assortment of nails of various kinds, the number of which will, we believe, astonish the uninitiated. From the diminutive "tingle" or baby tack up to the massive ship spike, almost every kind of nail is shown, not only in iron and steel, but also in copper, zinc, and brass, and on the partition will be noticed a somewhat novel application of nails. The position of their stand being rather an awkward one for displaying a sign, but Messrs. Galloway have by a display of nails on the partition made known their specialities. We have seen lettering done in fancy brass nails before, but the use of iron nails for this purpose strikes us as being rather novel and apropos.

DYNAMOS, PUMPS, &c.

Messrs. Alley and Macellan, engineers, Glasgow, have the Westinghouse standard automatic engine, the Westinghouse engine and dynamo, driving direct, also the last-named machine driving by friction, Westinghouse pumps, "Sentinel" steering gear, &c. A small dynamo, with specially-wound armature, increasing the output 50 per cent. as against an ordinary machine, is one of the attractions on the stand of Messrs. Paris and Scott, Norwich. Mr. John Grantham, of Blyth, shows a pump, which will not lose its priming, the chamber always containing water. A well-known firm are Messrs. Drysdale and Co., Bon-Accord Works, Glasgow. They are represented by the "Bon-Accord" vertical centrifugal pumping engine for circulating water through surface condensers, emptying ballast tanks, pumping from the bilge, for use in graving docks, &c. The "Eclipse" automatic gas governor, shown by Messrs. Hargreaves and Bardsley, of Oldham, will save from 15 to 40 per cent. of gas without reducing the

light, and it is claimed for the invention that it is a complete protection against over-pressure. One of the finest stands in the whole of the West Section is that of Messrs. Amos and Smith, of Hull. Their collection of steamsteering gear is a unique one, and is one of the best shows of the kind in the court. Mr. Thos. Stevens, of Coventry, whose products are known to everyone, has an improved Jacquard loom for weaving all kinds of illuminated silk goods, such as bookmarks, neckties, pictures, &c. Mr. Wm. Wilde, of Macclesfield, also show an attractive exhibit in the form of a Jacquard machine with power loom making silk handkerchiefs, as well as an appliance for producing fancy fringe on goods.

LAUNCH ENGINES.

Messrs. Ernest Scott and Co., Close Works, Newcastle, have brought a fine collection of machinery to the Exhibition. They have their high speed launch engine, Ashton's power meter and continuous indicator, an electromagnetic machine for separating iron from other substances, and other interesting pieces of machinery.

BOOTH.

Some splendid machinery used in the manufacture of boots is placed on the stand of Messrs. L. Pearson and Co., Bigg Market, Newcastle, including Standard screw machine, sole sewing, stitching, and rivetting machines. The well-known Newcastle firm of boot and shoe makers, Messrs. S. and C. W. Dixon, also show some fine machinery used in the boot trade. Besides the "Blake" sewing machine and the "Keats" fair stitching machine, they have the "Standard" screw machine, which will screw from 250 to 300 pairs of boots per day.

GAS ENGINES.

The firm of Messrs. Crossley Brothers, Openshaw, show their new design horizontal gas engine, of nine horse power, which is capable of indicating 18-horse power, fitted with the most recent improvements. They also exhibit their new design "Otto" horizontal gas engine of 4-horse power nominal, combined with a dynamo, fitted with new fly-wheel, and capable of filling forty to fifty 20-candle power incandescent Swan lamps. The clever "Dougill" gas engine shown by Messrs. Hindle, Norton, and Co., of Oldham, will doubtless attract attention.

HOIST AND OTHER MACHINERY.

At the south end of the west annexe, Mr. Jonathan Pickering, of the Globe Works, Stockton-on-Tees, shows his celebrated lift and hoists. His warehouse hoist is a conspicuous exhibit. Near this stand is that of Messrs. Swinney Brothers, of Morpeth, a well-known local firm. Their exhibits include complete brick-making machinery, mortar mills, ranges, stoves, &c. A novelty shown by the firm is a splendidly-executed medallion of the Queen in cast iron. Messrs. E. Beckwith and Co., of Sunderland, agent for Mr. John Cameron, of Manchester, and Mr. Isaac Hill, Derby, has a splendid assortment of machinery. He shows Cameron's massive punching and shearing machine, which weighs about twelve tons, and which has been supplied to the principal shipbuilders in the country. It is capable of punching and shearing heavy ship plates, and also cuts angle-irons. There is a very novel exhibit amongst those from Mr. Hill's works. This is Isaac Hill's patent saw for cutting iron and steel when cold. It will cut steel castings or other work flush. The machine cuts the new Z angle iron at a rapid rate. The apparatus for sharpening the saw is of a wonderful character, but as simple as it is clever. There is also on the stand a slew machine, by Cowley and Co., for cutting various kinds of threads which cuts the full thread in one operation. A fine collection of machinery has been got together in the space reserved for the exhibits of Messrs. Hulse and Co., Salford. They have their improved sliding, surfacing, and screw-cutting lathe, improved hollow spindle turning and screwing lathe with capstan rest, self-acting slotting machine, vertical drilling and boring machine, horizontal milling machine, and other pieces of machinery. The Beck Gas Engine Company, of St. Nicholas's Chambers, Newcastle, show their two and four nominal horse-power "Beck" gas engines, suitable for all purposes where great economy and steadiness in working under varying loads is required. Another large

stand is that occupied by the Worthington Pumping Engine Company, of London, and 50, Side, Newcastle. They exhibit their high-pressure and compound steam pumps for land, marine, and colliery work; Murdock and Co.'s combination governors for marine engines from 70 to 500 horse power. They also show specimens of plates cut from marine boilers showing results of defective circulation, and drawing showing boiler filled with circulating tubes. Among many attractive exhibits on the stand of Messrs. Henry Watson and Sons, of High Bridge Works, Newcastle, his patent flat strainer for straining paper pulp with Watson's machine-made bronze strainer plates is particularly worthy of mention. They also show their "Oriental" double-acting steam pump specially made for feeding high pressure boilers, the Downton pump (Admiralty pattern), &c. Messrs. Joseph Evans and Sons, Wolverhampton, have a capital display of their "Cornish" and "Reliable" pumping engines and pumps of all descriptions. There is also a capital collection of donkey pumps, underground pumps for collieries, stop valves for steam, &c., on the stand of Messrs. J. and G. Joicey and Co., of Newcastle. Messrs. Carrick and Wardle, of Gateshead, have a capital display of articles. Their gas buoy, which weighs about five tons, will be one of the attractions of the court. Palmer's Shipbuilding and Iron Company, Jarrow, have a beautiful model of a set of triple compound engines. There are also on the stand photographs of engines made by the firm for her Majesty's ships "Surprise," "Alacrity," "Orlando," and "Undaunted." Mr. A. G. Mumford, of Colchester, shows specimens of his donkey and other pumps.

GAS MANUFACTURE.

A most curious and interesting exhibit is that erected by Messrs. Ashmore, Benson, Pease, and Co., Limited, of the Gasholder Works, Stockton-on-Tees. It takes the form of a complete gas works, manufactured in portable form of cast and wrought iron, and in connexion with the filling up of which neither masonry nor brickwork is necessary. The portable gas works is compact and neat, and takes up extremely little space. This invention should be exceedingly useful for collieries, mansions, factories, &c. In country districts, especially, its adoption in many instances should satisfy the cry for "more light."

WEIGHING MACHINES, &c.

Messrs. Henry Pooley and Son, of Liverpool and London, who have a branch establishment on High Level Approach, Newcastle, are represented in this court by a stand on which they show specimens of their famous weighing machines. Perhaps one of their most interesting articles is their patent automatic and self-registering grain scale, which will be in motion, driven by an Otto gas engine. This clever machine is very extensively in use in flour, rice, or oil mills, breweries, malt-houses, distilleries, starch factories, grain stores, elevators, &c. An attractive display has been got together by Messrs. W. and B. Cowan, of Edinburgh, including light dry gas meters, siphon overflow, pressure gauges, &c. Messrs. Schaffer and Budenberg, of Southgate, Manchester, show their expansion regulator, the object of which is to make an ordinary engine work almost like an expansion engine. Their four pendulum governor is a speciality which deserves the recognition which it is meeting.

BREAD AND CONFECTIONERY MAKING.

The making of bread, pastry, and confectionery is quite a speciality in the court, and will comprise one of its greatest attractions. The machinery of Mr. Jas. Johnson, C.E., of Manchester, in operation at Melvin's bakery has already been described in our columns. This oven will bake batch after batch of bread without stopping for re-heating. It is of simple construction, and is an economiser of fuel. Mr. H. C. Calley, of London, also has a practical working bakery with latest improvements. He will give daily demonstrations of cake, pastry, and bread making. Messrs. W. and M. Marwick, of Edinburgh, will manufacture Scotch confectionery of all kinds at their stand. Messrs. Fry and Sons, of Bristol, make chocolate, cocoa, and all kinds of chocolate confectionery by machinery in motion. Messrs. Rowntree and Co., of York, also

have machinery exhibiting the manufacture of cocoas and chocolates from the roasted nibs to the finished article. Mr. Thomas Galloway, of Newcastle, also has a splendid collection of sugar boiling stoves, machinery for making drops, rock, candies, &c.

OTHER EXHIBITS.

Other exhibitors of machinery, models, &c., in this court are:—Metallic Valve Company, Liverpool, metallic valves, &c.; Messrs. Kirk and Co., Stoke on Trent, Thompson's multiple spring compensating piston; Mr. J. H. Widdowson, Manchester, machine taps, &c.; Mr. J. C. Martin, Newcastle, steam pipes covered with papirus non-conducting boiler composition; Mr. C. Thompson, Newcastle, lathes, tools, &c.; Messrs. Moorhouse and Co., Stalybridge, asbestos fittings, &c.; Messrs. Asquith, Ornsby, and Nicholson, Seaton Delaval, apparatus for detaching coal and stone; Potentite Explosives Co., Glasgow, potentite for blasting; Messrs. Barker and Co., Fenton, Staffordshire, picks, hammers, &c.; Mr. Stephen Humble, Westminster Chambers, London, safety detaching hooks; Mr. John Gjers, Middlesbrough, model of Bessemer steel works plant; Tyne Patent Coal and Stone Drill Company, Asquith and Ornsby's drilling apparatus; Messrs. Scott and Co., Oldham, gas safety valve and gas governor; Mr. T. Blanford, Corbridge, automatic stoker for steam and other boilers; Messrs. Buckley and Co., Sheffield, pistons, packings, &c.; Mr. M. H. Pattinson, Carlisle, baking powder, egg powder, &c.; Proprietors of Morgan's Lamp Patents, miners' safety lamps; Mr. Evan Thomas, Aberdare, model of coal screen, safety lamps of all kinds; Mr. Wm. Patterson, Dean Street, Newcastle, safety lamps, tempered steel cloths, &c.; Flexible Glass Co., London, fancy goods manufactured from spun glass; Messrs. Hall and Spoor, Gateshead, washing machines, trunks, &c.; Patent Exhaust Steam Injector Company, Manchester; Messrs. Dorman and Smith, Manchester, electric light plant, fittings, &c.; Messrs. Bond and Co., Tow Law, wheels, rolls, sheaves, &c.; Northfleet Coal and Ballast Company, samples of chalk, flint, &c.; Messrs. Dotchin and Co., Grey Street, Newcastle, engineers' and other tools; Messrs. Cowell and Chapman, ironmongers and tool makers, Newcastle; Messrs. Bainbridge and Crimson, Gateshead, ornamental wrought iron work; Messrs. Botting and Co., Robert Street, London, S.W., gas burners; the Patent Argand Gas and Oil Burners' Company; Mr. B. H. Thwaite, Victoria Street, Liverpool, model of twin gas producer for furnace firing, &c.; Messrs. Walker and Peile, Whitehaven, pipe joints, &c.; Naxas Wheel and Machine Co., Edinburgh, wheels, files, &c.; Mr. James Lyons, Cambridge, slide lathe, &c.; Wallsend Cement Company, Newcastle, Portland cement, concrete, testing apparatus, &c.; Messrs. Johnston and Co., Gateshead and London, Portland cement, with testing apparatus; Messrs. Stott and Co., Oldham, covering for drums, and pulleys for preventing slipping of straps; Messrs. Glenfield and Co., Kilmarnock, water meter, pressure recorder, &c.; Messrs. Arden and Co., Stockport, "Stockport" silent gas engine and "Bischop" gas engine; Messrs. Moore, Murton, and Varley, Keighley, wringing and mangling machines; Britannia Company, Colchester, lathes, &c.; Mr. W. H. Grant, Coventry, improved Jacquard loom in motion; Mr. Thos. Boston, Newcastle, tools; Accordion Pleating Manufacturing Company, London; Carbon Cement Company, Glasgow and Clydebanks; Messrs. Alder and Mackay, Edinburgh, gas meters; Messrs. J. Peck and Co., Wigan, tarpaulin articles; Mr. J. C. Carter, Newcastle; Messrs. P. Jackson and Glaister, Darlington, all kinds of hickory and other shafts for tools; Mr. Thomas Pape, Newcastle, fishing tackle; Messrs. Whitley and Co., Newton-le-Willows, Lancashire, hinges, locks, &c.; Messrs. Gibson Brothers, Bedlington, horse shoes, and Messrs. J. C. Porrett and Co., Sunderland combined folding chair and stool, &c. There is the court an exceptional fine collection of the latest and most improved sanitary appliances, fireplaces, gas fittings, &c. Messrs. Smith and Co., Coalville, Leicestershire, have got together a splendid collection of ornamental, embossed, and enamelled tiles; and Messrs. R. Craggs and Son, of the Marble Works, Haymarket,

have fine samples of chimney-pieces and decorative work in British and foreign marbles. Mr. Jacob Barstow, of Pontefract, shows Barstow's patent combination water filters which have two distinct mediums for filtration. The Carron Company, Carron Works, Stirlingshire, have a large stand at the extreme end of the north-west annexe, where they display cooking apparatus for hotels, restaurants, clubs, mansions, &c., close fire ranges, cooking apparatus for steamships, stable fittings, &c. In the west annexe Messrs. Mawson, Swan, and Weddell, chemists, &c., of Newcastle, show a capital speciality in their "Newcastle" filters, which the firm have already exported in large quantities to India, China, and the colonies. Here they have filters in glass, earthenware, and metal, suitable for all domestic and other purposes. There are also on view large glasses containing the various materials used for their filters. Messrs. Shanks and Co., Glasgow, also have an excellent show of sanitary appliances. They have baths beautiful in structure and convenience. They show specimens of large baths which can be placed in the middle of a room without being built in by bricks. Mr. R. Herron, of Northumberland Street, Newcastle, is on the same stand with a splendid collection of baths, wash basins, lavatories, &c. Mr. George Hudson, of Sunderland, on the same stand, shows his "matchless" reflecting gas lights. Messrs. John Fell and Co., Westgate Road, Newcastle, whose works are at Wolverhampton, show a unique collection of bath and lavatory valves, plumbers' brass work, beer machines, bar fittings, &c. Mr. J. C. Halliday, of Grainger Street, Newcastle, and London, besides other exhibits, shows his well-known "Clapton" lights. Mr. Thomas Heron, Holborn Viaduct, London, has an attractive collection of various kinds of gas burners, globes, the patent metropolitan lantern, of from 20 to 2,000 candles, &c. Messrs. Henry Walker and Son, of 55, Westgate Road and Gallowgate Iron Works, Newcastle-on-Tyne, have had considerable space allotted to them, and on their stand, which has three fronts, they have placed grates and mantelpieces, of beautiful designs and exquisite workmanship, chandeliers and gas brackets in endless variety, and cooking and sanitary appliances of the most improved kind. The stove grates and wood chimney pieces placed in the south front of the stand are very fine specimens. A Louis XV. grate placed in the centre is really a work of art, the figuring, gilding, and general ornamentation being superb. The mantelpieces and overmantels are also artistic conceptions. The visitor will be struck with the richness of the tiles used in the interior of some of the fireplaces. In the middle of the stand a finely-finished double oven kitchener, with nickel plated mounting is placed, as well as other ovens and ranges, on the most improved, economical, and effective principles. One of the most interesting displays in this section of the Exhibition will doubtless be that in the space allotted to Messrs. Dinning and Cooke, of Percy Iron Works, Newcastle, at their stand in the north-west annexe. The firm have erected at considerable cost improved stable fittings arranged as a loose box and two stalls. The pillars are made in strong cast iron with moulded tops and flanged bases for bolting to the stone. The front of the loose box has a deep ventilating panel, and by a special arrangement opens both inwards and outwards. The stall divisions are of the same construction as the loose box division, and are provided with a sliding barrier, the ball end of which when drawn out fits into a socket in the wall, and forms the stall into a loose box. The floors are laid in granite concrete, with a channel gutter specially designed by the firm to allow a fall towards the trap, with the floor laid level. The model stable will, no doubt, engross the attention of all interested in the latest improvements in stable sanitation. The firm also show a capital collection of the latest types of baths, including a handsomely-finished independent bath with canopy and appliances for hot and cold water, plunge, shower, douche, spray, wave, or any combination of them. Messrs. Emley and Sons, of 42 and 44, Westgate Road, Newcastle, and Marble Works, Gateshead, and agents for Messrs. Archibald, Smith, and Stevens, London, have

a beautifully-fitted up stand in the north-west portion of the court. The firm show several ingeniously-constructed hand lifts, hydraulic door springs, "Scientia" cures for smoky chimneys, ranges of the most improved designs, stoves, Fraser's mechanical telephone, Miller's patent handy fire engine, &c. Morrell's Sanitary Company, of Manchester, show their patent sifting ash closet and other sanitary specialities, and Mr. J. Black, Todmorden, exhibits an invention for preventing the stopping up of gutters, spouts, &c. Messrs. Laidlaw and Son, gas and water engineers, Edinburgh, also have a fine stand on which they show gas meters, brass fittings, extinguishers, fire and other articles. There are also several stands on which there are some fine specimens of timber. Messrs. Armstrong, Addison, and Co., of Sunderland, have a nicely got up stall on which they exhibit fences, gates, posts, palings, &c., creosoted or kyanised as a means of preservation. They show specimens of blocks for wood paving, and samples of wood which has been in use for many years as sleepers, fences, &c. A striking stand is that of Messrs. T. C. Hardy and Co., Argyle Saw Mills, Newcastle. A carved oak pulpit on carved and chiselled stone base, to be erected in St. Cuthbert's Church, Newcastle, is a distinct feature of the stand. There are also fine specimens of doors in mahogany, teak, pitch pine, redwood, and other kinds of wood, as well as carriage builders and cartwright's timber. Mr. John Herring, of the Close, Newcastle, has on view some beautiful specimens of Swedish wood, with doors made of that material. A fine stand has been fitted up by the North of England School Furnishing Company of Newcastle and Darlington, and of which Mr. Rochester is the Newcastle manager. Here will be found every requisite for schools and colleges. The North-Western Educational Trading Company of Liverpool also have an attractive stand. On this stand will be found school and college requisites of every kind, and of the most approved kinds. A stand of more than ordinary interest is that erected by Dr. H. E. Armstrong, Medical Officer of Health, showing a model of the Newcastle Corporation Infectious Diseases Hospital at Heaton, Newcastle, and representing all the buildings, wards, outbuildings, &c. There is also an interesting exhibit in the form of a model of the new Floating Hospital for infectious diseases, the property of the River Tyne Port Sanitary Authority, designed by Mr. W. G. Laws, C.E., and built by Messrs. Wood, Skinner, and Co., shipbuilders, Bill Quay. The Northumberland and Durham Society for the Home-Teaching of the Blind is an institution whose value it is difficult to overrate, and the members of the society have done well in drawing further public attention to its work by showing all types, English, Continental, and American, writing cases, chess and draught boards, &c., used by the unfortunate blind.

ARTISANS' EXHIBITS.

The artisans exhibits are an important section of the articles displayed in this court, and, indeed, in any part of the building. It is gratifying to observe the response which has been made to the desire expressed by the Exhibition authorities to have a collection of the products of the skill of northern artisans. The desire to take advantage of the privilege thus afforded was so great that the application for accommodation exceeded the available space. However, about a hundred interesting models, &c., have been placed in the north-west corner of the court, where they will attract crowds of admirers. The exhibits are mainly local, preference being given by the committee to articles from the two northern counties. It is impossible even to mention all the items in this fine collection in this notice. Some of the most ingenious exhibits are:—A patent "winter," by Adam David, Durham Street, Bentinck, Newcastle; model of vertical engine, by J. Clark, Brunswick Street, Gateshead; a bookcase by a blind man, Allen Dickson Hay, Clifford Street, Byker; model of double horizontal engine, by Thompson Finley, Lower Cuthbert Street, Gateshead; model of steamboat, by William Forster, High West Street, Gateshead; violins, by Robert Gladstone, 117, Scotswood Road, Newcastle; model yachts, by Wm. Greggs, Tyne Street East, Newcastle, and Wm. Harrison, St. Vincent Street, Sunderland; mechanical sight feed lubricator, by J. T. Hedley, Hall Street, Bentinck

Newcastle; wood needlework picture, by John Hornsby, Devonshire Street, Monkwearmouth; model of H.M.S. Temeraire, by R. Innes, Strickland Street, Newcastle; model of triple expansion engine, by R. Johnson, Gloucester Road, Newcastle; model for 200 feet steam yacht, by T. S. Leathard, Archbold Terrace, Jesmond; picture of the great fire in Newcastle and Gateshead, October, 1854, by Wm. Murphy, Newcastle Fire Brigade; model rolling mill, by John Oxley, Millfield, Sunderland; clockwork model of belted cruiser, by R. Petrie, Wylam Road, Newcastle; model of hydraulic coal-getting machine, by Edward Rowe, Chilton Moor; and model of 35 ton muzzle-loading Frazer gun, by Horace Wallish, Belgrave Terrace, Newcastle. The Tynemouth Life Brigade have a stand adjoining the artisans' models, on which they show engravings and models of life-saving apparatus, many of the exhibits being shown by the Board of Trade. They also have models of the earliest lifeboats. The stand cannot fail to be an attractive one.

PICTURES AND MODELS.

In this north-west corner of the court there are a number of designs, photographs, &c. Mr. Theodore West, Darlington, shows lithographed sheets illustrating the invention of the locomotive; Mr. B. Gilbert, Anemone Nurseries, Bourne, has oil paintings of new scarlet anemone; Mr. M. C. James, of Wallsend, exhibits seven ship drawings, executed by students attending the exhibitors' class in naval architecture at the School of Science and Art, Corporation Street, Newcastle; Mr. J. W. Taylor, Westgate Road, Newcastle, shows his bird's-eye view of the proposed extension of Blackett Street to Barrack Road, Newcastle. Mr. Ardagh Long, of Jarrow, exhibits a number of models of yachts and racing cutters. In this portion of the court there is also a considerable portion of wall space devoted to the exhibition of photography. Mr. Pike, of New Bridge Street, Newcastle, exhibits some beautiful specimens of portrait, landscape, seascape, &c., and samples of orthochromatic plates. Messrs. F. M. Laws and Sons, of Blackett Street, Newcastle, show photographs illustrating their work by platinotype and other processes. A fine collection of portrait photography has also been got together by Mr. M. Auty, Tynemouth, who has specimens of the different processes of enlargement from smaller photographs. Messrs. Mawson and Swan, of Newcastle, exhibit photographic prints from negatives taken in gelatino-bromide dry plates; and Mr. W. Parry, of South Shields, has instantaneous views of fast cruisers, machinery, &c. At the press view on Saturday it was observed, although the West Court presented a scene of great bustle and activity, that most of the stands were approaching completion. A few had not received their exhibits, and several of the smaller stands were not indicated by the names of the exhibitors, but the above description of the contents of the court will be found to be very nearly complete.

THE SOUTH COURT.

This court is approached by the East or West Court. It is 390 feet long, and consists of a central arcade and one lean-to. The exhibits are arranged in rows from east to west. The articles shown are most heterogeneous, and the various colours and shapes of the stands, and the nature of the goods displayed thereon, combine to make the court an exceedingly picturesque and generally interesting one. One of the first things which strikes the visitor upon entering the South Court at its junction with the East Court is the word "Theatre," which is placed in large gilt letters above a spacious doorway on the South wall of the Court. To gain admittance to the temple of Thespis the visitor has to pass through a passage lined with a magnificent collection of photographs, which form part of the competitive display gathered together by the Newcastle-upon-Tyne and Northern Counties' Photographic Association. This part of the Exhibition will be referred to in detail elsewhere, so nothing further respecting it need be said here.

THE THEATRE.

As the Theatre will form no inconsiderable attraction of the Exhibition, some description of it is necessary. The building is a substantial and spacious one, the number of persons it is estimated to accommodate being 1,500. Although it is only a temporary structure, it is of a most substantial character, and no expense or trouble has been spared to make its interior as attractive and comfortable as possible. The stage is of good dimensions, and the orchestra equally so. There are four neat and comfortable private boxes. The best seats join the orchestra, and behind these are the second seats, and then the pit. Around the theatre extending from the private boxes to the front of the galleries are two balconies, which provide adequate space to be utilised as a promenade. The scenes have been painted by Mr. Dangerfield, the artist of the Theatre Royal, and he has executed them with his acknowledged taste and skill. The front of the stage presents a very neat appearance, and the building as a whole is as compact and comfortable as could be desired, even were it intended for a permanent, instead of a temporary structure. Then, as regards the lighting of the building, nothing could be more complete; and it is asserted that this is the only theatre in the world wholly lighted by electricity. No gas will be used in the building. The provisions connected with the arrangements for using the electric light are such as leave nothing to be desired, and such, also, as will prevent any of the inconveniences which sometimes arise from the failure of this the prince of lights. Everything that could be thought of to prevent the occurrence of such a misfortune has been done, and every possible precaution against fire has been adopted. There are three distinct electric circuits, and arrangements have been made which give the stage manager absolute control over the lights. One difficulty in the use of the electric light for such a purpose has been overcome. As everyone is aware, at certain periods in the enactment of the play the lights have to be lowered. Of course this is a thing readily done when gas is in use, but hitherto it has not been an easy task with the electric light. But, as has been stated, the difficulty has been overcome in this instance by resistance coils of iron wire arranged outside. A switch board placed at the corner of the stage gives to the stage manager the power of altering at will the whole of the lights in the auditorium. By such means the lights may, when desired, be reduced from sixteen candle power to about one candle power. In like manner the footlights and the elevated stage lights may be adjusted, it being possible to reduce them from 16 candle power to 5, or even $1\frac{1}{2}$ candle power. The foot lights and upper lights may be regulated independently of the rest, inasmuch as they are on separate battens. Three separate circuits are brought into the theatre, so that the continuity of the light inside the building is assured. The lamps upon these circuits being supplied with an electric current from separate dynamos, separate engines, and separate boilers, there must be three accidents simultaneously to throw the building into darkness for a longer time than would be necessary to turn the switch.

THE ENTERTAINMENTS IN THE THEATRE.

Having said so much about the construction and the lighting arrangements of the theatre, it is necessary to give some slight sketch of the plans of the spirited lessees—Messrs. Howard and Wyndham, of the Theatre Royal, Newcastle—and the character of the entertainments which they intend to provide during the Exhibition season. In respect to the character of the entertainments and the ability of the actors and actresses who will be engaged to occupy the boards of the theatre, lovers of the drama will have, we feel sure, no cause to complain. The wide and long experience of the lessees, and their knowledge of the tastes of the play-going community, quite fit them to undertake the task of providing acceptable dramatic entertainments for the thousands who will visit the Exhibition during the period it remains open.

THE OPENING PIECES.

The pieces which will be the most generally played will consist of burlesques and comedies. The company which has been got together to open the theatre on the 11th

inst. is a well-selected one, and includes some well-known artistes, many of whom have during the past season taken principal parts in pantomimes in the large towns of England. On the opening night the very clever and popular comedietta by F. W. Broughton, entitled "Withered Leaves," will be produced. The various parts will be taken by Mr. J. J. Nevin, Mr. F. W. Wyndham, Mr. J. C. Eversley, Mr. Whalley, Miss Jenny Dawson, and Miss Lillian Francia. This will be followed by Mr. H. J. Byron's burlesque of "Ivanhoe." The following is the cast of this piece:—

Cedric, the Saxon	J. C. Eversley.
The Palmer	Miss Lillian Francia.
Sir Brian de Bois Guilbert	E. W. Coleman.
Isaac of York	Mat Robson.
Prince John	Miss Nellie Bennett.
The Black Knight	Miss Alice Spry.
Wamba	Miss Jenny Dawson.
De Bracy	Miss Zillian Murray.
Oswald	Miss Rennie.
Lady Rowena	Miss Blanche Paige.
Rebecca	William Morgan.
Knights, Peasants, Courtiers and Attendants	
Cissy Nell, Maude St. Clair, Castleman, Kerr, Alice St. Clair, Kitty Driscole, &c.	

A SPECIAL PERFORMANCE.

It has been decided to give a special performance on Tuesday preceding the formal opening of the Theatre, for the purpose of testing the electric light, and the lessees have decided to hand over the entire proceeds to some deserving object, which will be duly mentioned hereafter. At this performance the Royal Exhibition band, under the leadership of Mr. J. H. Amers, will play selections of music. "Withered Leaves" will be enacted, and there will also be the Carolina Banjo Troupe and other attractions.

FUTURE ARRANGEMENTS.

Variety entertainments will be given when the Theatre Royal in Grey Street is open. In connexion with the theatre it may be mentioned that there are two entrances—one through the interior of the Exhibition, and the other from the North Road. A reduction of sixpence in the charges of admission to the principal parts of the house will be made to those entering from the Exhibition.

THE PHOTOGRAPHIC ASSOCIATION.

In the passage leading to the Theatre and upon both walls at the east end of the South Court, there is a large and splendid collection of photographs, which forms the competitive exhibition of Newcastle-upon-Tyne and Northern Counties' Photographic Association. This association, which has been in existence a few years, holds a competitive exhibition every year, at which prizes are awarded, and this year it was decided to hold the competition in connexion with the Exhibition, marking the occasion by adding medals to the prizes. The result of this has been to bring together a larger display of photographs than in previous years. Most of the leading photographers are represented. Portraiture is well represented, so is landscape, in which the work of many amateur members of the association is shown. In addition to silver prints, there are many examples of the permanent processes brought out and perfected during the last few years. Some of these reproductions bear marvellous resemblance to fine steel engravings. The platinotypes, which come under this head, are marvellously like fine engravings. The instantaneous branch of photography, which has been perfected lately through improvement of lenses and extremely sensitive dry plates, is one of the most striking features of the whole collection, good examples being a perfect photograph of the "Flying Scotchman" as seen passing at the rate of fifty miles an hour through the bridge at Low Fell Station, and some yacht studies by West and Son, Isle of Wight. Again, there are some fine examples of the gelatino-bromide, a new process which does away with the use of glass plates, the photographs being taken direct on the paper. Excellent examples of this process are, "Tynemouth Pier in a Storm," by Mr. M. Auty, of Tynemouth, and "Hoar Frost at Wilford, Notts." There is also a case of very fine composition photographs by Mr. L. Sawyer, of Newcastle. Of the carbon process, which enables the photographer to produce a portrait which is permanent, there are also some good examples.

But by far the greater portion of the exhibits are the ordinary silver prints, and in this section some fine portraits of exquisite finish are shown by Mr. Lafayette, Dublin; Mr. W. J. Bryne, Richmond, Surrey; Mr. H. S. Mendelsohn, London; and Mr. H. P. Robinson, Tunbridge Wells. Mr. Laws, Newcastle, shows a choice case of vitrified ceramic enamels, which is a process that gentleman has spent much time in perfecting. Altogether the display of photographs of all kinds is a most splendid one.

THE DINING ROOMS.

On the south side of the South Court we have one of the most essential parts of the whole of the Exhibition. Here are situated the capacious dining rooms of Messrs. Gibson and Co., of the Douglas Hotel, Newcastle. Nothing is wanting here in the shape of provision for satisfying the requirements of the inner man. The arrangement of the rooms, of which there are three, is pretty much the same as at the Indian and Colonial Exhibition. The grill room and restaurant, in fact, are conducted on the same principle as Messrs. Spiers and Pond's grill rooms in London, Messrs. Gibson and Co. having been fortunate enough to secure as manager of their various refreshment establishments at the Exhibition Mr. J. H. Meyer, who was manager of the refreshment departments at the Gaiety, and the Colonial and Indian Exhibition in London, and who has succeeded in having the various rooms in the interior nicely arranged. For the past week or more the grill room, which occupies a central position on the south side of the court, has been a scene of considerable activity, hundreds of visitors and those engaged in the Exhibition having availed themselves of the opportunity of dining well at comparatively low charges. A bill of fare, on which are the prices of the various dishes, is handed to each guest. In addition to the grill room and restaurant there are other two rooms—one to the east and the other to the west of the grill. That to the east is known as the "Exhibition Dining Room," wherein dinners at fixed prices will be provided. In the room on the west side of the grill, capable of accommodating about 150 persons, business will be conducted on temperance principles, and a substantial "popular" dinner will be provided at one shilling per head. The grill room and the Exhibition dining rooms are of large dimensions, each being sufficiently spacious to seat comfortably 250 persons. The whole of the rooms are comfortable, and the free admission of light from the roof during the day time serves to render them very pleasant. At night they will be lighted by innumerable electric lamps. In these rooms alone it is possible for between 600 and 700 persons at least to dine at one and the same time, whilst simultaneously about 500 persons can have cold luncheon at the bars. In the kitchen there are 10 cooking stoves, 1 grill, 2 pastry ovens, and 2 roasting ovens. Messrs. Gibson have about 150 hands employed in their various refreshment establishments. Everything supplied is of the best quality, and the attention paid to customers by the numerous waitresses is all that could be desired.

CARRIAGES.

Of late years great strides have been made in the construction of carriages of every description. The large, heavy, and uncouth vehicle in use some twenty or more years ago has given place to the light and daintily finished carriage of the present day. No accurate conception of the vast improvements effected in this direction can be made until a comparison has been made of the old carriages belonging to Her Majesty the Queen, arranged contiguous to those of the present day, which are exhibited in the South Court by some of the leading builders in the country. There are two rows of them, in the centre, reaching from the gangway which leads from the east entrance to the quadrangle to the Art Gallery, and within a short distance from its junction with the West Court. First and foremost come those lent by the Queen, numbering 6 vehicles of different shapes and sizes. Two of them, at least, are worthy of more than passing notice, inasmuch as they were presented to her Majesty many years ago by two of the crowned heads of Europe—Louis Philippe and the Emperor Nicholas. That presented by the former is a

char-a-banc of large size, whilst that presented by the Emperor Nicholas is a sledge of Russian build. Another of the Royal exhibits is a chariot on "Cee" springs, which must have been made some forty or fifty years ago, and another a cab phaeton of the period of George IV. on "Cee" springs, made by Passmore, of Windsor. The latter very much resembles a Victoria, which is exhibited by Mr. Lawton, of Liverpool, and a comparison of them shows the remarkable progress which has been made in this industry during the last five decades. There are also amongst the Royal exhibits two wicker cots, which are likely to attract considerable attention, inasmuch as they were used for the Prince of Wales and the Princess Royal in their infancy. These cots do not in any way resemble the elegant and highly finished perambulator of the present day. They are placed on bodies and axles of wood, and instead of being driven as perambulators are, they are pulled in bogie fashion, by means of a substantial wooden handle in front. Next to the Royal carriages are those of the well-known Newcastle firm, Messrs. Atkinson and Philipson, Pilgrim Street. The exhibits of this firm consist of six carriages of their own make, and they adequately illustrate the improvements which have of late years been introduced into the building of different kinds of carriages. The landau which they exhibit is similar in design to that for which they were awarded a silver medal at Amsterdam. It is on "Cee" springs, and fitted with a self-acting arrangement to prevent the breakage of windows. The interior fittings of this elegant vehicle are really beautiful. The Lambton omnibus which they exhibit is remarkably light, considering that it is built to accommodate 8 inside and 5 outside passengers. It is also provided with an electric bell and electric lamps. A brougham shown by the same firm is a fine one, the trimmings being of a luxurious character. The rest of Messrs. Atkinson and Philipson's exhibits in carriages consist of a substantial dogcart, a Scarborough phaeton, and a Sparkenhoe. Each of these is an elegant and fine specimen of its kind, the interior trimmings being neat and tasteful, and the exterior daintily and finely finished. On the same stand are displayed specimens of the firm's home-made harness, whips, rein-holders, and a variety of carriage and harness accessories, all of which show the most skilful workmanship and finish. Messrs. Atkinson and Philipson are also agents for Messrs. Forder and Co., Wolverhampton and London; Messrs. Ridges and Sons, Wolverhampton; and Messrs. Marston and Co., Birmingham, all of whom have sent carriages of the most elegant appearance. They are also agents for Mr. Edward Clennett, of West Hartlepool, who exhibits a patent appliance for raising the windows of railway and private carriages; for Fox's patent tyres, which prevent the wheels of carriages slipping into tramways; and for Schanschleff's electric lighting apparatus, by means of which the lighting of a carriage by electricity is placed under the control of the coachman. Mr. N. J. Proud, Carlisle, shows four fine vehicles. Mr. J. A. Lawton, of Liverpool, exhibits his famous "Cee" spring Victoria, besides three more vehicles. The Institute of British Carriage Manufacturers exhibit, per Mr. John Philipson, numerous drawings illustrative of the history and manufacture of carriages. Messrs. Henry Angus and Co., coachbuilders, Newcastle, have a space of between 600 and 700 feet at the west end of the South Court, and a handsomer display of carriages of all kinds there is not in the court. Their exhibits consist of seven carriages, a case of home-made harness, and a collection of interesting articles connected with the trade. First we notice a landau with rocks, fitted with automatic appliances for opening and closing the doors without having to put down the windows. The lamps of this carriage, which are lighted by electricity, are also adapted for burning candles. Then there is a miniature landau which has all the novelties of the larger kind except the electric lamps. This carriage is remarkable for the lightness of its wheels. A style of carriage which is rapidly coming into favour is the landauette—a sort of half landau and half brougham—and Messrs. Angus show an exceedingly neat specimen. The carriage which is likely to be considered the gem of this firm's collection is the

George the Fourth phaeton, which is of an entirely original design. It combines some of the curves common in carriages at the beginning of the century with those of a very stylish modern phaeton, and is a light and beautiful specimen of the art of coachbuilding. A nice Whitechapel which is shown on this stand is fitted with Angus's patent sliding seat, a slight pressure on the handle of which is sufficient to move the seat either backwards or forwards. A Tilbury gig or buggy, with hood, and a tourists' gig of light construction complete Messrs. Angus's show of carriages. On this stand there is an exhibit of a very interesting nature. It is a very perfect model of a mail coach which was made in the second year of her Majesty's reign. The "Beeswing" mail coach, which ran between Newcastle and Darlington, was made from this model.

A LARGE LAMP.

At the top of the east portion of the space allotted to the carriages visitors will notice an exhibit of an exceedingly novel character. This exhibit takes the form of a monstre carriage lamp, sent by Messrs. Lowe, Sleigh, Bevan, and Co., of the Clarence Works, Birmingham. The height of this lamp is 10 feet 5 inches, and the circumference 10 feet 6 inches. Inside the lamp is a display of specimens of the manufactures of the firm, consisting of ordinary-sized modern carriage lamps, coach fittings, saddlery, harness mountings, &c. It may be mentioned that the monstre lamp was manufactured by Messrs. Lowe, Sleigh, Bevan, and Co. for the Melbourne Exhibition, and that they were awarded two silver medals for artistic design and excellence of workmanship.

SADDLERY.

A most attractive and expensively got-up case is that of Mr. Edward Newton, of Grainger Street, Newcastle. In this case, which, with the exception of the top and bottom, is entirely composed of glass, is a display of all manner of whips, saddles, military, racing, colonial, and otherwise, and harness of all the lighter kinds. There is an exhibit on this stand which is likely to attract considerable attention, it being the whip which was used by the driver of the Queen's horse on the coronation day in 1838. This whip has been lent by permission from the Royal Mews at Windsor Castle. Mr. Rd. Wright, Richmond, Yorks, exhibits patent safety stirrups.

MESSRS. SUTTON AND SONS, SEEDSMEN,

As the visitor enters the South Court from the west end, the stand which is most likely to attract attention is that of Messrs. Sutton and Sons, Reading, seedsmen by Royal warrants to her Majesty the Queen and H.R.H. the Prince of Wales. This stand, which is on the right of the west end of the court, is unquestionably one of the largest and most picturesquely arranged stands in the whole court. Anything more complete and interesting in its way it would be impossible to find in any of the courts. Upon it the most enterprising agriculturist will find something of interest to him, whilst there is that which will interest even the man who tills his own piece of land. The stand occupies a prominent position, and is about 23 yards in length. It may be described as consisting of four large sections. The space from the floor to the level portion, which will measure a few feet, is occupied by samples of grass seeds suitable for all soils and all climates. Immediately above this, on the level, there is a glass case divided into nine different compartments, the beauty of which is enhanced by coloured illustrations of different kinds of plants, &c. In these nine compartments are arranged most artistically models of cabbages, carrots, beans of all shapes and kinds, melons, onions, cauliflowers, and tomatoes. These models are so beautifully-formed that the uninitiated are apt, even after an inspection, to mistake them for genuine specimens of the various vegetables which they represent. Then, again, between this section and the cases which are arranged in a perpendicular manner, there is a space of about a foot which extends the whole length of the stand; and here are displayed photographic views of Messrs. Sutton and Son's extensive establishment, and they sufficiently indicate the position the firm occupies in its particular line of business, and convey to the spectator an idea of the extent of the trade which is carried on by the firm. Certainly, the most striking portion of the stand is that

which rests upon the space we have briefly described. This part is also divided into nine sections. The centre case is surmounted by the Royal arms and two others—one on each side the centre case—by those of the Prince of Wales. In the first we have a model of Messrs. Sutton's improved "Mammoth Gourd," which weighs 223 lbs., models of monstre red and yellow mangles, and a varied collection of turnips of different shapes, colours, and sizes. In other cases seeds, specially selected for Russia, India, Japan, China, and other countries, are tastefully displayed; in others, samples of grass; in another, a model of a cluster of cucumbers as in growth; and in another three models of tomatoes, the whole forming a very pretty picture.

MESSRS. LITTLE AND BALLANTYNE.

To the west of this stand, with only a small vacant space between, Messrs. Little and Ballantyne, the well-known Carlisle firm, have erected a small, elegant stand, in which they show a choice collection of dry natural grasses. On the outside they have a stand upon which are arranged all the varieties of grass and clover seeds used in the formation of permanent pastures and rotation crops.

MR. W. J. WATSON, NEWCASTLE.

Above this stand we have the exceedingly neat and interesting stand of Mr. W. J. Watson, nurseryman, Newcastle. This case is divided into one large and two small divisions. In the centre one there is a beautiful collection of almost every conceivable kind of fern in actual growth, and in the smaller ones seeds and sundry gardeners' tools.

MESSRS. WEBB AND SONS.

At the north-east end of the South Court, almost immediately opposite to Sutton's and Little and Ballantyne's stand, is that of Messrs. Webb and Sons, of Wordsley, Stourbridge, and also of London and Paris. This firm's case is a very fine one, and occupies a prominent position. As Messrs. Webb and Sons are seedsmen by Royal warrants to the Queen and Prince of Wales it is scarcely necessary to say that their display is of a most complete character, and second only as a show to that of Messrs. Sutton. Their models of some of the new kinds of vegetables are most life-like. There is a fine collection of natural and other grasses, which are recommended for permanent pasture, alternate husbandry, lawns, cricket grounds, &c. Specimens of the firm's selected seed corn, noted for the large size of the ear, length of straw and fielding qualities, and farm seeds, are also tastefully displayed. Amongst the latter must be mentioned Webb's imperial swede, the variety that has been awarded the champion prizes at Birmingham for the last fifteen years.

MESSRS. FINNEY AND CO.

In this section of the Exhibition it is exceedingly pleasing to notice that a local firm of seedsmen—Messrs. G. Finney and Co., Newcastle—have kept pace with their brethren who are fortunate enough to reside in the more genial portions of the country. Messrs. Finney and Co.'s stand is a very neat one indeed; it adjoins that of Messrs. Webb and Sons, and we venture to state that the specimens of grasses, seeds, &c., are in no wise inferior to any in the Exhibition. Certainly this stand affords an interesting comparison with those before noticed. Whilst the specimens of turnips on the latter are in reality only life-like models, those on Messrs. Finney and Co.'s stand are the real articles, and additional interest is given to some of the roots, inasmuch as they have been grown on her Majesty's farm at Windsor; others on the Prince of Wales's farm at Sandringham; and others on the farm of the Duke of Connaught.

GRACE DARLING'S LIFEBOAT.

Perhaps the exhibit in this court which is likely to attract the most general attention is the boat and oar of Grace Darling, which have been lent by Mrs. Joicey, of Newton Hall, Stocksfield-on-Tyne, to the Shipwrecked Fishermen and Mariners' Royal Benevolent Society for exhibition. The boat has been so frequently described, and the public are so well acquainted with the facts connected with the incident in which Grace Darling acted so bravely, that it is needless to dilate further upon them. Grace Darling's name is a household name; and it is peculiarly appropriate that the boat in which she and

her father rowed to the rescue of the passengers on board the wreck *Forfarshire*, on the 7th of September, 1838, should be devoted to a purpose so praiseworthy as that of augmenting the funds of the society already named. The boat and car have been at other exhibitions, and have proved a source of no inconsiderable aid to the society. Two boxes are placed on the boat, which stands at the west end of the South Court. Into these boxes visitors may drop what coins they choose, and in return they receive a small photograph of the boat and car.

CONFETIONERS' CASES.

To the east end of this court there are many beautiful cases; in fact, these are the most attractive in the whole Exhibition. The space about this end of the court is almost entirely occupied by the stands of biscuit and jam manufacturers, confectioners, and spirit merchants. Although perhaps the smallest, those of Mrs. M. Cowan, confectioner, Northumberland Street, Newcastle, and Mr. G. Simpson, Westgate Road, Newcastle, are certainly the prettiest. Close by there is another excellent stand, erected by Messrs. Terry and Sons, York, in which candied peels, silvered goods, &c., are displayed in profusion. Messrs. Crawford and Sons, Edinburgh, and the Manchester, Newcastle, and London Wholesale Co-operative Society, Newcastle, Limited, have tasteful displays of biscuits; and Messrs. Chivers and Sons, Histon, near Cambridge, and Messrs. Beach and Sons, Toddington, Cheltenham, have equally nice displays of different kinds of jam. Preserved meats are shown by Messrs. Lord, Son, and Co., London, and jams, marmalades, &c., by Mr. J. H. Turnbull, Sunderland, and Mr. Duncan Macgregor, Edinburgh.

LEATHER AND INDIA-RUBBER.

In a prominent position on the north side of the Court is the stand of Messrs. George Angus and Co., of St. John's Leather and India-rubber Works, Newcastle. Of its kind this stand is of the most complete character, every kind of article connected with the trade being displayed thereon. The principal exhibit is a leather link belt, 40 inches wide, which is equal to 300 horse power. Caoutchouc is shown in its various stages of manufacture, from the raw gum, as taken from the trees, to the manufactured article ready for use. The engineering and mechanical community will find on this large stand much that will interest them, for here are displayed india-rubber valves, sheets, washers, buffer springs, delivery and suction hose pipes, rubber and cotton mill bands, tubings, and asbestos goods in every form. To the north-east of this stand we have one of the most beautifully arranged and complete stands in the whole court; it is that of the India-Rubber and Telegraphic Works Company. Upon it the company have a display of telegraphic cables, medical batteries, gutta percha, leather goods, india-rubber, in its raw and manufactured state, ebony goods, and a large and miscellaneous display of the different kinds of goods in which they deal. More in the centre of the court is the large stand of Mr. Henry A. Murton, Grey Street and Market Street, Newcastle. This stand is devoted to the display of the various india-rubber and gutta percha productions as applied to surgical, chemical, domestic, and other uses. Under the first head we have elastic rubber, water and air beds for the use of bed-ridden persons; air and water pillows, to keep the head cool; air cushions for travelling purposes, and every appliance necessary for an hospital or a sick room. Under the second head we have bottles and carboys for holding acids, india-rubber gloves and boots for use when mixing acids, and vulcanite and other tubes for conveying and holding strong acids and liquids. Then, under the head of articles for domestic use, we have combs, brushes, and even knitting pins and thimbles made of india-rubber. Of ladies' waterproof cloaks there is a large and well-assorted collection. These cloaks are made in all the latest fashions at Mr. Murton's establishment. Some of them weigh only a little over half a pound, and may be folded so as to be easily carried in a lady's handbag. Of gentlemen's cloaks, fishing utensils, driving capes, &c., and cricket and tennis requisites, there is a large and well-assorted display. To the north of Mr. Murton's stand is that of Messrs. Tuck and Co., Limited, Liverpool, London, &c. This stand contains a large assortment of india-rubber goods

for mechanical purposes, leather belts, valves, delivery and suction hose, and triple packing for triple expansion and other high pressure engines. The Gandy Belt Manufacturing Company, London, show patent driving belts; the Rossendale Belting Company, Newcastle, belts; Messrs. J. G. Fenwick and Co., Newcastle, tanned and manufactured leather for harness; Messrs. Turney and Co., Stourbridge, leathers; and Messrs. Tullis and Co., London, beltings.

DRINKS.

Pleasant to contemplate and reflect upon, are the stands of the various manufacturers and exhibitors of spirits, beer and aerated waters. These stands, many of which are most costly structures, are arranged at different points in the South Court. An interesting case is that of Messrs. Henderson and Turnbull, Leith, upon which Scotch whisky, the acorn and Corrichoillie brands, is shown. On this stand there is a curiosity in the shape of an old mutton-ham bottle, dated 1795, one of the kind used by the Scotch smugglers to deceive the Excise officers a hundred years ago. The Coldstream Brewery Company have a stand of a striking character, made principally of beer barrels, the ends shown being nicely painted. In this respect, the company referred to are not singular. Messrs. C. Vaux and Sons, brewers, Sunderland, and Messrs. T. E. Chapman and Sons, Lambton Brewery, Sunderland, and others having stands made on a similar plan. Undoubtedly the most attractive stand in this court belonging to tradesmen in this particular line of business is that of Mr. James Jamieson, brewer, of Edinburgh, it consisting of a beautiful large-sized model in crystal and nickel silver of Scott's Monument. Then, a little to the east of this stand is that of Messrs. Blayney and Co., Newcastle, upon which is a show of whisky and a model of a Highlander holding in his hand a bottle of that seductive fluid. Messrs. Turnbull and Wood, of London, Perth, and Newcastle, have an assortment of "Glen" whisky, whilst Messrs. Reid Brothers and Co., Newcastle, have a case of what they style "Encore whisky," which is recommended by several medical journals and medical men. In addition, Messrs. Reid have a display of other brands, and wines. Different kinds of whisky, &c., are shown by Messrs. Mitchell, and Co., Belfast; Messrs. James Robinson and Son, Newcastle; and Messrs. Ringnes and Co., through a Newcastle agent. And different kinds of aerated waters are shown by Mr. Thornton, South Shields, and Messrs. Lyon and Co., of Liverpool. At the west end we have the large and well-stocked stand of the Liebig Wine Company, Liverpool and London, on which there is a display of Liebig's beef, wine, Canadian extract of beef, &c. The manufacturers of Spratt's world-renowned dog biscuits have a stand at this end of the court. Messrs. John Mackay and Co., Edinburgh, have two nice stands—one to the east and another to the west of the court. In one they have a display of different kinds of aerated waters and the sparkling "Castalina," and in the other essences and different kinds of their preparations. Mr. W. Glendinning, wine and spirit and soda water merchant, Grainger Street, Newcastle, and Messrs. Hugh Baird and Son, malt roasters, Glasgow, have nice stands. An interesting stand to the west of the entrance to the grill room is that of Messrs. Burroughs and Wellcome, chemists, London. This stand is made entirely of New Zealand timber, elaborately pillared, carved, corniced, and decorated with representations of the prize medals, which have been awarded to the firm at other exhibitions; and the articles upon it include pocket medicine cases, beef and iron wine, and a miscellaneous collection of other objects. Messrs. Bell and Riddle, chemists, Hexham, have a neat case.

MUSTARD.

The cases of two mustard manufacturers occupy a prominent position in the centre. One of these contains specimens of Messrs. J. and J. Colman's mustard, and the other those of Messrs. Ainsley Bros., of Durham. On the latter stand is exhibited mustard in its various stages of manufacture, and a sample of the "Original Durham Mustard," as supplied to King George II. Mustards are shown by Messrs. Champion and Co., Limited, London, and Messrs. Keen, Robinson, and Belvill, London.

TOBACCO.

The show of tobacco, &c., in the South Court, is not an extensive one, but there are five very nice cases—one belonging to Mr. Robert Sinclair, Newcastle, another to Mr. John Sinclair, Newcastle, another to Messrs. W. F. Telfer and Co., Newcastle, a fourth to Messrs. John Telfer and Co., Newcastle, and a fifth to Messrs. Heatley and Sons, Alnwick; and in each there is a tasteful display of the leaf and all manner of tobaccos. Immediately facing these cases is a stand of goodly dimensions belonging to Messrs. Lyons and Co., of London, where cigars, pipes, and cigarettes will be made.

MISCELLANEOUS.

Near this stand, Francis Merlo, of the Roma Restaurant, Newcastle, and M. A. Zoccola, of London, have a stand on which there is a display of Italian wines, Italian oil, and Italian soup. A. Levy, of the International Glass Works, Bristol, has a show of fancy and plain glass. This gentleman has workmen on the spot who do all kinds of engraving on glass whilst purchasers wait. On one side of the tumbler glasses which he shows there is a beautifully engraved view of the Exhibition, and on the other side purchasers may have their names engraved. Displays of different kinds of wringing machines, sewing machines, mangles, bicycles, and perambulators form quite a feature in this court. Amongst the exhibitors in this section worthy of special notice are Messrs. Newton and Co., Westgate Road Newcastle; Messrs. J. A. Chapman and Co., Sunderland; Messrs. Kirsp and Co., bicycle manufacturers, Newcastle, who have a large collection of different kinds of cycles; Mr. Jas. Turnbull, Newcastle; Mr. Henry Chas. Askwith, Hull; the White Sewing Machine Co.; and Messrs. W. and S. Summersdale and Sons, Keighley. Messrs. Edward and Jas. Richardson, Elswick Leather Works, Newcastle, and Messrs. Turner and Co., Stourbridge, have stands upon which leather of different kinds is arranged. Messrs. Edwin Richards and Son, Wednesbury, show axles, cant-arms, &c.; Josephine Eryel, London, embroidering and braiding machines; Mr. W. Newton, Newcastle, mangles, sewing machines, &c.; Messrs. Corry and Co., London, patent baby jumpers and swings; and F. Selby and Co., Birmingham, axles. The North of England Cycle Company, Newcastle, and Messrs. Erdell and Co., Newcastle, have displays of every kind of bicycles and tricycles. Mr. Roger Errington, Victoria Steam Mills, Sunderland, shows on his stall cattle, game, and poultry spice, &c. Messrs. Hindhaugh and Co., Newcastle, have a similar display, and an assortment of different kinds of meal. Messrs. James Thomson and Son, corn merchants, Edinburgh, have a stand on which their manufactures are displayed; and there is also a stand upon which is displayed Thorley's food for cattle. The manufacturers of the Swendborg Oxenbjerg Flour Mills show flour through their representatives, Messrs. Clepham and Wiencke, Newcastle. The Waterloo Mills Cake Warehousing Company, Limited, Wilmington, show oil cakes, &c.; Mr. C. Ling, Carlisle, oats, groats, barley, &c.; and Messrs. Morris, Little, and Son, Doncaster, their patent fluid sheep dip. Prinzen and Van Glabbeck, one of the leading firms of butterine manufacturers in Holland, have, through a local agent, a stand in this court, as have Nestle's Swiss Milk Company. Mr. A. W. Buchan, Waverley Potteries, Portobello, shows samples of Scotch pottery, both useful and ornamental. Messrs. Dunn and Hewitt have a case in which, besides cocoa and coffee in their various shapes of manufacture, they display a beautiful model of the cacao tree. Cocker Bros., Sheffield, show carriage springs, &c. It must be mentioned that a number of stands in this court have not been alluded to simply because they were not completed on our visit; others have unfortunately been left unnoticed because the owners names were not on them, and others because the stands and cases were empty.

Then we have two cases containing tins of the various kinds of biscuits manufactured by the well-known firm of Messrs. Carr and Co., Carlisle, and another to the east containing innumerable specimens of the biscuits manufactured by Messrs. Squire, of Newcastle.

THE EAST COURT.

The East Court, which was visited first, and which runs parallel with the North Road, is literally packed with elaborately constructed stands containing goods and fancy articles which will doubtless prove a great attraction to the lady visitors. Here we have an assortment, as rich as it is varied, of lace, woollen and silk manufactures, carpets of all kinds and sizes, glass of beautiful colours and exquisite workmanship, silver and electro-plated goods, terra-cotta and fine art pottery, jet, gold, and silver jewellery, elegant draperies, sewing machines, modern examples of bedroom, drawing-room, and dining-room furnishings, &c. A short distance below Messrs. Reid's exhibits, Mr. James Farthing, Newcastle, shows several items which will be viewed with great interest. The most important is a fine old cabinet which is said to have belonged to the Derwentwater family. The cabinet is beautifully inlaid and is a most intricate piece of furniture, containing no fewer than thirty secret drawers. The exhibits in this court also comprise all kinds of boots and shoes, surgical and nautical instruments, cutlery of all sorts, clocks and watches, art decorations, and Indian and German curiosities. Another exhibit of special interest is the old and modern telegraphic apparatus from the historical collection at the South Kensington Museum, sent by the Postmaster-General. Many of the stalls on Saturday were in a fair way towards completion, and although some of the exhibitors had not placed a single article for exhibition, a great number, on the other hand, had hurried their preparations forward for the "press view," and their exhibits were shown with all the "opening day" finish. This was particularly noticeable in the room furnishings and decorations, than which finer examples have not been shown at any other exhibition.

WARE AND GLASS EXHIBITS.

Seldon has so large and varied an exhibition of glass and ware been shown at one place as that seen in the East Court. Glass of brilliant colours and exquisite designs, glass cut, twisted and moulded, some of English and foreign manufacture, of all colours, sizes, and shapes, are scattered in rich profusion on all sides. The firms showing the glass and ware are numerous. A noticeable stand is that erected by Messrs. Stevens and Williams, of Stourbridge, who have a speciality for cameo and fancy vases, cut decanters, bowls, &c. H. Setzer, of Munich and Dusseldorf, exhibits a special kind of stone ware made from clay found on the banks of the Rhine. Most noticeable in this exhibit are the grotesque specimens of drinking cups, imitation old Roman ware and bronzes, and bunches of German feathers and grasses. Another attractive stand is that of B. Grosebaum's, manufacturer of Dresden art china goods. Here are shown beautifully printed plaques of large sizes, handsome vases and bronze statues. One of the most attractive stands is certainly that of Townsend and Co., who have made what must in all truth be pronounced to be an elegant display of all classes of china and glass goods. On another stand in this court we find an attractive display of articles solely manufactured in Newcastle. This is at the stand of Mr. C. T. Maling, Ford Potteries, Newcastle, who shows fine earthenware of every kind, including a highly decorated dessert set, together with chamber ware and articles of household use. Messrs. Carter Brothers, of Edinburgh, also show pottery and glass, spar, marble, &c. Other firms are Greener and Co., Sunderland; Count Harrach, Bohemia; H. Foster and Co., Newcastle; J. van Praag, Edinburgh; Messrs. Poole and Wilson, Edinburgh; James Rooker, Birmingham; Sowerby and Co., Newcastle; A. Mackie, London; A. Conti and Co., London; and the Ipsen Terra Cotta and Fine Art Pottery (Messrs. Arup Brothers) have a stand of very large dimensions showing all kinds of ware and pottery of an elaborate description.

STATIONERY.

Messrs. Mawson, Swan, and Morgan, of Grey Street, Newcastle, have a large stand, where the firm will show relief stamping and copper-plate printing, materials illus-

trating the manufacture of paper, illuminated addresses, specimens of printing, and a quantity of pencils, pens, wax, and fancy articles.

WHITBY JET MANUFACTURES.

An exhibit which will be a centre of attraction and source of instruction to visitors will be Mr. B. H. Frampton's Whitby jet manufactures. Inside the handsome and elaborately constructed stand three skilled artists, from Whitby, manufacture from the crude Whitby jet highly-finished ornaments. The origin of this beautiful material is a subject on which there is considerable difference of opinion. It has frequently been described as coal, but it is generally believed to be bituminous. The jet is found embedded in rock in masses of various forms and magnitude. One famous mass was reported to be 20 feet long by 6 feet wide. In mining the jet from the rock it is generally broken into small pieces, but occasionally some are obtained three or four feet long by about a foot wide. As the masses occur in all parts of the rock, months of labour are often spent in vain. There are two distinct kinds of Whitby jet — the hard and the soft or colitic jet. A Spanish soft jet which has been introduced into the market is very brittle, and when exposed to atmospheric influences its surface has a tendency to crack. This jet is, however, capable of a high polish, and its beautiful appearance renders it a dangerous article for unskilful buyers. It is often sold for the "best jet" and this is one reason why ladies, who have experienced breakages with the so-called "best" article, become prejudiced against jet of any superlative description. The prime cost to manufacturers of Whitby hard jet varies from 8s. to 10s. per pound, and in some cases eighteen-pence to nineteen-pence per ounce has been paid. Foreign jet is imported and sold to manufacturers at Whitby, from 10s. to 30s. per cwt. When lumps of jet are obtained suitable for working, they are sawn and split into the required form with saws and chisels. They are then taken to grindstones, where a flat surface is given. All the subsequent operations necessary to prepare the various ornaments for sale are performed by hand machines. A sort of lathe is used in which stones, boards, and brushes are the means of bringing the articles into their proper shape. All round work, such as beads, studs, and rings, are turned on the lathe with fine tools. In hand engraving, some very exquisite specimens of the jet workers' art is produced. Fruit foliage, flowers, and endless varieties of designs are executed with surprising closeness to nature. The manufacture of jet ornaments has become one of the staple trades of Whitby. Besides all kinds of jet goods, Mr. Frampton exhibits a brilliant array of French jewellery and fine cut crystals.

A SILVER JUBILEE TROPHY.

Amongst other silver articles, Messrs. Reid and Sons, of Grey Street, Newcastle, exhibit an interesting ornament as a commemorative silver Jubilee Exhibition trophy. It is in the form of a fruit and flower stand. The central portion is a representation of the fine old tower of St. Nicholas's Cathedral, and surmounting the spire is a winged figure displaying a scroll, "Hail to Victoria's Jubilee." The base of the tower, which is decorated with panels on which are delineated sketches of old and new Newcastle, figures representing science and labour are placed; and the industries of the district, as well as groups of appropriate implements, are portrayed. At each end a figure reclines holding up models of steamships. Communion sets and various kinds of jewellery are also shown.

VISITING CARDS.

Visiting cards are supplied on the "while you wait" principle by Mr. J. Carter, of 22, Napier Street, Shieldfield, Newcastle. The cards are printed on a "Magand" printing machine, of French manufacture. The ordinary printing machines strike off copies of cards at the rate of five or six hundred per hour, but on this machine addresses, etc., can be run off at from seven to eight thousand per hour. The machine, which is of ingenious construction, both "feeds" and "flies" the cards itself. It is the outcome of the great and rapid demand there is for cards in France, where it is the custom for friends to ex-

change cards upon auspicious or other occasions. Mr. Carter can supply 100 cards in five minutes.

THE DERWENTWATER RELIC.

A stand which will doubtless prove of great interest to visitors will be that of Mr. James Farthing, who shows two cabinets of high finish, a buhl clock, and two old Chinese vases. One of the cabinets is said to have belonged to the Derwentwater family, and a more elaborate piece of workmanship could scarcely be met with. The cabinet has the appearance of being well stocked with drawers, but various parts of the woodwork can be taken to pieces, and no fewer than thirty secret drawers and cavities disclosed. The facing of each drawer is inlaid, in one kind of wood, with a view of Palestine. This piece of furniture has a rather romantic history. While "Amelia, Countess of Derwentwater," was contesting her claim to the Derwentwater estates, her goods and chattels were seized by the bailiffs at Dilston and brought to Newcastle for sale. This cabinet is said to have been taken amongst the goods, but was "bought in" for the "Countess" by a friend. A short time after the unfortunate lady's goods were again seized and put up for sale, and Mr. Farthing secured this relic. On the large panel of the cabinet is inscribed, in a scrawling handwriting, the words: — "From James III. to my loving Lord of Derwent Waters, 1716."

THE JUBILEE SAFE.

The half-sized model of the Windsor Castle safe, used for the keeping of her Majesty's jewels, and built by Messrs. Hobbs, Hart, and Co., of London, will be an object of interest. Some idea of the original, which was supplied to the Queen's order by the firm in 1878, may be gathered from the fact that the model exhibited weighs 3 tons 6 cwt. It is constructed entirely of steel, and is ornamented with royal blue and gilded mountings. The safe is seamless in the body, and there are three locks on the door. While one of these locks is gunpowder-proof, a second, the "change" lock, is capable of some 5,000 automatic changes, and the other is termed a "violence" lock. Internally the safe is commodious, and externally it presents the appearance of a monument of defiance to the burglar and his instruments. The firm also exhibit several sizes and kinds of their famous safes, and numerous kinds of locks and keys.

A MEDICAL INVENTION.

Dr. Henry Newton, of Newcastle, has introduced an appliance for eliminating the pernicious particles from air during the process of inhalation. It is designed for the use of lead workers, and, after the fashion of the respirator, it covers the nose and mouth. It is light, can easily be cleaned, and in no way prevents conversation. The Chief Inspector of Factories remarks upon the appliance: — "It is the best thing of the kind I have seen, as it entirely obviates the objection to all others of the kind, which become so readily clogged." So many deaths have occurred recently from lead poisoning and from other causes with which this appliance is intended to grapple, that any means introduced for the purpose of saving life or making it more endurable is a public benefit. The invention is exhibited by Messrs. R. McQueen and Son at their stall of scientific instruments.

MISCELLANEOUS EXHIBITS.

Mr. R. Brooks, hatter, of Clayton Street, Newcastle, shows, in a handsome case, the different processes of fur-dressing; and in a second compartment displays the different stages of hat-making. The stand is surmounted by hats of different sizes common enough in hot climates, but veritable curiosities in their way in this country. Messrs. Adam Carse and Co., hatters, of Grainger Street West, Newcastle, also exhibit an elaborate case of goods. A number of boots and shoes, highly finished, are shown by the Newcastle Co-operative Society; and Messrs. S. and C. W. Dixon, of Grey Street, Newcastle, have also erected a handsome stand of leather goods. Mr. Robert Adams, of Blackman Street, London, exhibits several patents for door closing and window cleaning. So many fatal accidents have been caused through window cleaning that patents of this description will be looked upon as a great boon. All danger is avoided by making the windows reversible through the application of Mr. Adams's patent to the sashes of the window.

There is also exhibited a patent door spring and slam check, by means of which a door may be kept open at any desired angle, and made to close at any required point. Messrs. Hargreaves and Company, of Stockton-on-Tees, show a case of the "Excelsior" blind cord, pulleys, and brackets.

SILK AND CARPET WEAVING.

Messrs. John Hutton and Sons, of Newcastle, exhibit a loom at work weaving rugs, &c. In its simplest form the loom is worked by hand, and, notwithstanding the wonderful improvements which have been effected in the power loom since its invention, there are still many fabrics manufactured by hand looms in this and other countries. In India, which most probably is the home of the loom, and where silks of almost unrivalled beauty are made, the natives continue to use this machine in its most primitive form. The loom exhibited is known as a "witch loom," and will produce woollen fabrics, reversible and diverse designs on both sides, or checks and twills with any coloured background. Various designs and colourings in carriage and travelling rugs will be produced. The firm exhibit a number of their productions, and also a beautiful portrait of the late Prince Consort, which was made for exhibition about the year 1851. An interesting exhibit is that of Ernest E. Barker, who shows silk, from the worm to the loom. Silkworm and moths, cocoons, and raw silk, are submitted for inspection in a case; and on the loom, which is worked by one man, various "Jubilee" patterns in silk handkerchiefs, specially designed for the Exhibition, are woven. Silk weaving is also executed by W. Wilde, of Macclesfield. A beautiful handkerchief can be run off the loom in half an hour.

WIRE EXHIBITS.

Messrs. Mountain and Sons, wire workers, of Newcastle, have a very handsome case, constructed entirely of black and white wire, and it is decorated with flowers, leaves, and wreaths formed of wire. Internally the stand is stocked with all kinds of wire work, much of which is of an interesting character.

WOOLLEN MANUFACTURES.

Mr. T. A. Potts, of Newcastle, has a large stand for the exhibition of several machines for the manufacture of a number of woollen goods. Machines will be seen turning out gloves, stockings, pants and vests, fancy goods, ladies' jerseys and vests, &c. About fifteen hands will be employed in this exhibit, and as this is an industrial centre which will demonstrate much that could be done in household management, large numbers of visitors, especially those of the gentler sex, may be expected to view Mr. Potts's exhibit with interest. Besides the machinery, there is a large case containing fine wools, beaded slippers, crewel silks, and a variety of fancy goods. Adjoining this stall similar work is done by the well-known firm of Fleming, Reid, and Co., of Greenock, and by James Foster, of Preston and Manchester.

FURNITURE, &c.

Messrs. Bainbridge and Co., of Market Street and Bigg Market, Newcastle, are exhibitors in this court of high-class furniture and other fittings, and present specimens of the best style of art in dining-room, drawing-room, and bedroom furnishings. The dining-room is fitted up in the Renaissance style of decorative art. The furniture is made of oak, fumigated, not stained, down to a rich tone. Excellent specimens of oak mantelpieces and overmantel, sideboard and dinner-waggon, and expanding dining table are shown. The chairs are upholstered in morocco leather and the remaining furnishings are of an Oriental description. The drawing-room furniture is made of rosewood, and the articles comprise mantelpiece, overmantel, bric-a-brac, chairs, which are upholstered in various coloured silks and Genoa velvets, a Kirkman grand piano forte, &c. The floor is covered with an Afghan carpet of novel colouring and vigorous design. The curtains for the windows are the latest productions in Madras muslin. The bedroom furniture is of walnut, and is treated in a free "Queen Anne" style. The bedstead is of brass, in a rich half-canopy design, specially manufactured for the exhibit. The floor is covered with an Afghan carpet. The mattresses are of the most approved description, and are manufactured by the firm from pure materials in their own factory. The entire exhibit is

surrounded by an elaborate solid walnut screen polished on both sides. It is 12ft. high, with two front elevations 45ft. each, and an end elevation 20ft. It is, without doubt, one of the finest erections in the Exhibition. Specimens of stained glass are shown the entire length of the screen. Each room is fitted with a grate supplied by Messrs. H. Walker and Son, of Newcastle. Visitors will not fail to admire the elaborately-designed "Jubilee" sideboard executed and exhibited by Mr. G. Bennett, cabinetmaker, Low Friar Lane, Newcastle. This work of art, which is of oak wainscot, portrays on panels several historical reminiscences of note in the life of her Majesty. On one of the panels the Queen is represented performing one of the first duties she was called upon to do—to deal with the death-warrant of a soldier. It is recorded that the word "pardon" was written across the document. Other panels depict the coronation of her Majesty, her visits to aged and sick fishermen at Osborne, and her inspection of the Children's Hospital in London. The pilasters surrounding the panels are all emblematical of the royal reign. John Bull is shown with wheat sheaves, representing the production of the United Kingdom. Peace is portrayed by a wreath of olives, and an African stands as the representative of the colonies, while India is represented by a Brahmin. Again we find the rose, the thistle, and the shamrock delineating the United Kingdom. In brass-work on the handles there is a neat medallion of the Queen, with the dates 1837 and 1887. Portraits of the Prince Consort, the Queen, Lord Melbourne, Lord Salisbury, Mr. Gladstone, and Lord Beaconsfield are carved on the back part of the sideboard, and there is a large bevelled-edged mirror in the centre. Mr. Bennett is to be congratulated upon the excellence of his exhibit. An elaborately-carved oak sideboard, manufactured by Punch Brothers, Middlesbrough, is shown by Mr. Jas. Stewart, of Newcastle.

MARBLE EXHIBITS.

At the north end of this court Messrs. Emley and Sons, of Newcastle, Gateshead, and Glasgow, have a very large exhibit of marble masonry, including altars and reredos, executed on the finest Paronazza marble, with steps and flooring. There is a fine pulpit in oak upon alabaster and stone base. The carved wood work is from the studio of Mr. Ralph Hedley. These exhibits are for the new church of St. George's, Jesmond. There are also marble chimney pieces, and grates furnished with art tiles and mosaics; English made brass clock and ornaments, electro plate and cutlery, door furniture, specimens of wrought iron, copper and brass work, statuary in marble and terracotta, and "Royal Jubilee" art drawing room and dining-room fire-places. One of the most interesting exhibits on this stand is the saloon of a passenger steamer in marble designed and prepared for this Exhibition by the firm. The work represents the style of decoration carried out on many of the largest ocean steamships. The interior is also suggestive of the manner in which the most artistic effect may be produced in the most enduring material for entrance halls, mansions, public buildings, &c. Mr. Jas. Nelson, of Carlisle, also exhibits a number of examples of marble masonry.

WATCHES AND CLOCKS.

A large case of watches, clocks, chronometers, opera glasses, and nautical instruments is exhibited by Messrs. G. and T. Davison, of the Side and Grey Street, Newcastle. A number of the watches on view are manufactured by the celebrated firm of Rotherham and Sons, of Coventry. It was remarked some time ago, by a gentleman of note, that if he wanted a hundred English lever watches he was not quite sure whether he could get them even in Coventry. Some idea, however, of the manufacture of watches in Coventry may be gleaned from the fact that Messrs. Rotherham and Sons employ girls and women, who, after adjusting the machinery for the production of one size and class of watch, construct them in batches of 13,000 at a time. There are three other watch manufacturers in Coventry, where watch-making is being conducted with the latest appliances. The idea that old England cannot compete with the foreigner in watch-making is, the English manufacturers maintain, all "moonshine." Mr. R. Metcalf, watchmaker and jeweller, of New-

castle, exhibits several cases of watches and clocks. A novelty in this exhibit is the neat clocks made by Mr. Metcalf from old verge watches. Mr. Metcalf buys up all the works of old verge watches he can, and by attaching a pendulum to the works, and mounting them in neat cases, a novel, and at the same time a useful article, is produced. Mr. J. Garland, of Newcastle, and Messrs. Bunn and Dick, of Newcastle, also exhibit a quantity of clocks, watches, and silver goods.

HOUSE DECORATIONS.

Some very fine examples of the modern styles of drawing-room, dining-room, and bedroom decorations are submitted for inspection by several well-known firms. Messrs. John Richardson and Co., of Dean Street, Newcastle, show three highly-finished specimens of room decorations. Messrs. F. Robertson, of Newcastle and Alnwick, have fitted up an example of dining-room painting, &c. In this exhibit there is a fine example of hand-painted frieze, the colours of which are brilliant and rich in tone. There are also shown various kinds of stains for wood. Messrs. Sopwith and Co., of Northumberland Street, Newcastle, have furnished and decorated a dining-room and drawing-room. The floor is covered with tapestry carpet, the wall is covered with Japanese wall paper, and there are some elegant specimens of oak furniture. There is also a cabinet made of black oak taken from the Tyne. Mr. John Coates, cabinet-maker and upholsterer, of Sunderland, has erected and fitted up a large dining-room and bedroom, both of which will prove interesting to visitors. A very showy panel comprising specimens in glass, writing, gilding, embossing and decoration, imitations in woods and marbles, &c., is placed in the south portion of the East Court by Mr. R. K. Creighton, of Derwent Place, Newcastle. Messrs. Bragg and Co., of Pilgrim Street, Newcastle, have erected an antique and attractive show stand. Our townsmen bring together a collection that will draw around it large crowds, for in one spacious department they show Thonet's famous bentwood furniture as manufactured by the London Oxford Street firm. Next to this display, an old English bedroom, with all the furnishings that charmed the sight of the well-to-do, is represented, and in another department other choice articles dealt with by the firm are shown. The Linerustica and General Decorating Company, of London, also have a handsome stand of room decorations, &c. Messrs. Jeffrey and Co., Islington, London, have a speciality entitled the "Royal Jubilee wall-paper." It is a very elaborate piece of colouring, and will bear minute examination. Mr. G. Brighouse, of Liverpool, exhibits an embossed absorbent paper for use in the imitation of various kinds of woods, in paint work. A very handsome exhibit of hand-painted wood panels, and specimens of English and French made furniture, screens, &c., is shown by Messrs. Giles and Co., of London. The Victoria Cane Mattress Company show several highly-finished examples of their manufactures; and Messrs. Chapman and Son, of Newcastle, have a handsome exhibit of room furnishings. Mr. R. J. Richardson, of Newcastle, shows an exceptionally attractive screen, consisting of painted imitations of inlaid woods, marbles, &c. The artistic work in this exhibit is of a very high standard.

SCIENTIFIC INSTRUMENTS.

Mr. Frederick Robson, of Dean Street, Newcastle, exhibits a large case of scientific instruments, the most important of which are an improved miner's dial—the improvement being that the adjustment for vernier is effected by a screw at the side; and a theodolite with an improved motion for quickly plumbing. In the old system, the whole apparatus had to be shifted, but by the aid of improved parallel plates the main portion only of the instrument can be very easily adjusted to attain the desired object. Messrs. Mawson and Swan, of Mosley Street, Newcastle, exhibit a handsome case of electrical apparatus and chemical balances. Mr. T. B. Winter, of Grey Street, Newcastle, has a case containing mining, surveying, and astronomical instruments, telescopes, &c. Large cases of surgical instruments are shown by Brady and Martin, Mosley Street; R. McQueen and

Son, and Robert Clark, of Newcastle. Messrs. Harrison and Son exhibit acting tidal gauges for docks, harbours, and reservoirs; and Messrs. Wilson and Gillie, of North Shields and Sunderland, have a stand of nautical instruments. Messrs. Cox, Walker, and Co., of Darlington, and Messrs. J. Woodcock and Son, opticians, of Sheffield, show various kinds of scientific instruments. Vitrite holders, and other fittings for incandescent electric lamps are shown by the "Vitrite Works," Low Teams, Gateshead. Mr. T. Gaskell, of Liverpool, exhibits a process of gilding by electric battery. A stand of photographic apparatus and material is shown by Percy Lund Co., Bradford.

HONITON LACE.

Messrs. James Coxon and Co., of Grey Street and Market Street, Newcastle, exhibit their wares in a most unique-looking erection. The interior of the bazaar is reserved for fine examples of Eastern carpets and rugs and rare specimens of silk and other Oriental fabrics. The towers surrounding the bazaar are converted into stalls where Japanese porcelain, art metal goods, Cairo stools, and Damascene stools are exhibited. Contiguous to the bazaar Honiton lace workers from the little fishing village in Devonshire will be seen plying their needles in reproducing fine specimens of this ancient art. Until early in the present century machine-made lace was almost unknown, and to this day the finest kinds are still produced by hand labour. The industry continues in the same neighbourhood where it was introduced by the Huguenots some 300 years ago. The more skilful workers seem to have settled at or near to Honiton, in Devonshire. Her Majesty's wedding dress was trimmed with a fine flounce of this lace, and wedding flounces for each of the Royal princesses were also made. Specimens of the work are shown in two show cases placed at each side of the workers. Messrs. Coxon also display decorative art needlework as applied to furnishing, mantel draperies, embroidered portiere curtains, cushions, antimacassars, an Italian bedstead, linoleum, and floor-cloths, &c.

CARPETS AND OILCLOTHS.

Raw material showing the several stages of manufacture of floor cloths, &c., are shown by Messrs. Barry, Ostlere, and Co., of Kirkaldy. Specimens of the manufactures of the firm—linoleum, plain and printed, tessellated pavements, cork carpets and oil-cloths—are also exhibited. The City Floor Cloth and Linoleum Company, Newcastle, show a number of products of the firm. Messrs. Anderson and Lee, the well-known makers of this class of goods, have a large exhibit of linoleums, floorcloths, &c.; and J. Rolls and Son, of London, have a really handsome exhibit of floorcloths.

OTHER EXHIBITS.

A great attraction to ladies will be Messrs. Thomas Young and Sons' case of table linen, embroidered sheets, pillow cases, towels, &c. The designs of the table cloths and napkins are of a very elaborate description, and the embroidery of the bed linen is well executed. Josephine Engel, of Fulham, London, exhibits Bonaz embroidery, and braiding machines for embroidery, braiding on cloth, linen, &c. Messrs. Hunter and Nisbet, of Newcastle; Messrs. George Harrison and Co., of Edinburgh; and Messrs. James Smith and Co., of Newcastle, have each stands of various kinds of tweeds for coatings overcoatings, trouserings, and suiting. Mr. Andrew Reid, of Newcastle, has in this Court a stand of transformation prints, and a great variety of transfers are shown. Mr. Jameson's safety paper will be displayed on a stall next to the one just mentioned. This article provides various precautions to hinder the tampering with written documents of any kind. The extreme importance of such a paper arises from the fact that an ink may be made which will wash off any ordinary paper without leaving a trace behind. The exhibitor will show two processes of how a document can be tampered with by ink of the kind indicated, and how the tampering process can be prevented by the use of the paper shown. In the case shown by Mr. Thomas Routledge, of Ford Works, Sunderland, esparto in all the stages requisite for the production of paper is shown. In addition to this the varied character of the products from the bamboo cane is ex-

hibited. Mr. A. Bernasconi, of Newcastle, shows a quantity of mechanical and musical figures and foreign fancy goods. Metal paste and furniture cream are shown by Messrs. Stephenson Bros., of Bradford. Some very fine specimens of ecclesiastical brass work are submitted for inspection by Messrs. John Mills and Sons, of Newcastle ; and Messrs. Jones and Willis, of Birmingham, also exhibit brass work—vases, candlesticks, &c.—for church use. Rothery's patent perfect security lock, latch and bolt combined, or separate, is shown by Mr. John

Brindle, of Whitehaven. Brass and silver-plated hand instruments, wood wind instruments, drums, &c., are exhibited by Besson and Co., of London ; and American organs are shown by Robert Kidd, of Bedlington. The process of printing handkerchiefs, showing numerous foreign styles, is exhibited by Messrs. Gillott, Golland, and Co., of Manchester. Messrs. Sage and Co., of London, exhibit air-tight show-cases ; and Messrs. Cooke Bros., of Birmingham, have a handsome case of safety-pins, fancy nails, hinges, &c.





THE FINE ARTS SECTION.

The idea of including a fine art collection amongst the treasures to be displayed at our great Exhibition was a particularly happy one. Newcastle is one of the few provincial centres which can lay claim to the possession of a school of art peculiarly its own. For over a century the town and surrounding district has produced a succession of artists, devoted to their calling, and claiming national recognition of their gifts. It is true that the talent evinced by these Northern painters has differed widely in its manifestations, but a general characteristic is traceable principally in the shape of a realistic love of nature, and a corresponding avoidance of the conventional and the artificial. In a great proportion of the cases, a remarkable affinity to the Dutch school was developed, with the result of work-production in the shape of sober-toned sea pieces, figure subjects dealing with the quaint and humorous aspects of humble life, minutely correct portrait painting, and landscapes in which the common animals of the farm figured largely. Bewick was racy of the soil, and so were Good, Parker, Cennell, Carmichael, and the Richardsons. Martin was phenomenal. At no period of its existence has the local school evolved a higher order of talent than it has done during the last half century, and it is doubtful whether any other part of the country of similar area and population has produced an equal number of front rank artists.

When the main plan for our Jubilee Exhibition was first sketched out, an art department formed no portion of it. All that was intended was that a limited number of pictures should be collected for the purpose of gracing or decorating the large building. The managing body, with this end in view, invited a number of our leading artists and amateurs to form a committee, and the response to the appeal was in all respects a satisfactory one. But the painters were soon found to be the working members of the body, and their influence really shaped the course which its deliberations eventually took. Briefly stated, the report presented by the committee affirmed that an art department to the Exhibition could be of little importance unless a special building was devoted to its purposes. For a short time the question of providing a suite of rooms for art exhibits hung in the balance, but finally a decision in favour of following this course was given. Thanks to the strong interest taken in the matter by Mr. Charles Mitchell, of Jesmond Towers, a comprehensive scheme for the constitution of the department was carried into effect. A large annexe to the main building was designed for its accommodation, and means were taken for collecting together as extensive a collection of high-class pictures as the resources of the district will permit of. Mr. Mitchell was elected chairman of the committee charged with the arrangements, and Mr. Thos. Dickinson (hon. sec. of the Bewick Club) hon. secretary. The president of the Bewick Club (Mr. H. H. Emerson) and vice-president (Mr. Robert Jobling) were also placed upon the committee, the members of which have worked with the utmost enthusiasm, and with a singleness of purpose deserving of the warmest recognition. The success which has crowned their efforts has been thoroughly merited. The Art Gallery annexe has been erected at the end of the grounds nearest to the city, and it is entered from the South Court. Corrugated iron

is the material of which the outer walls are composed, but they are lined with wood, and are thus rendered pleasant to the sight. Standing close to the Exhibition Theatre, the building is similar in plan and construction to that extremely clever and effective erection. It is lighted from the roof, and is of good proportions. Well would it be if some steps could be taken towards securing the building for the public Art Exhibition of which the city stands so much in need, and the establishment of which has been so strongly advocated by the members of the Bewick Club. By no stretch of the imagination can the structure be pictured as fulfilling the conditions desirable for a permanent gallery, but it would serve the purpose pending the arrival of those more enlightened times when our municipal rulers will be moved to recognise the important educational influences exercised by a free and public art collection, and to act accordingly.

The space at command within the building is divided into four large and two small rooms and an entrance hall. The dimensions of the great apartments are 58 feet by 30 feet, and the two small rooms are 30 feet square. The entrance hall is 20 feet square. Some difficulty has been experienced in the classification and arrangement of the exhibits, but the works have been finally differentiated under three sections respectively entitled, Contemporary British Artists, Contemporary Continental Artists, and the Loan Collection. An illustrated catalogue of the department is in process of preparation. In all about 1,050 paintings and drawings are hung in the section, and the insurances effected upon the loan collection alone amounts to £120,000. Works forwarded direct from the artists are hung at the risk of the exhibitors, by most of whom insurances have been effected. A few of the specialities in the department may be briefly mentioned. For instance, attention may be directed to the tapestries—after the fashion of the famous Bayeux series—placed on view by Sir Isaac Lowthian Bell, of Rounton Grange. The designs for this set were furnished by Mr. Burne-Jones, A.R.A., and the needle-work was performed by the late Lady Bell and her daughters. Her Majesty the Queen has contributed two important works to the collection, namely, "The Florence Gallery," by Zoffany, and Mulready's well-known picture "The Wolf and the Lamb." The Prince of Wales has signified his intention of exhibiting a painting by a Colonial artist. The Duke of Northumberland, the Earl of Durham, Mr. H. T. Morton, Mr. John Rogerson, Sir William George Armstrong, Mr. John Taylor of Newcastle, Mr. Alex. S. Stevenson, and Earl Grey have rendered important aid to the department, and, amongst the water-colour drawings, amateurs will find a rare treat in the shape of Mr. Thomas Crawhall's unique collection of little gems. At one time the committee intended to devote space to an exhibition of the works of the old masters, but it was soon seen that facilities would be lacking for such an undertaking. Difficulties followed the decision come to in this matter. A line had to be drawn as to the art period which the works hung should illustrate, and it was resolved that no paintings executed previously to the time of Sir Joshua Reynolds (1723-1792) should be accepted. This led to courteous rejections of several offers of most interesting and important works, and it was only by accident that any

exception to the rule was made. This happened, however, in connexion with the collection forwarded for exhibition by the Duke of Northumberland. Through the miscarriage of certain letters, his Grace was not made acquainted with the time limit decreed for the exhibits, and he forwarded to the committee some fine examples of great Italian masters which will interest every visitor to the department. However, the principal contributor to the loan collection is the Earl of Durham, who has sent from his priceless collection of the works of Sir Thomas Lawrence, certain family portraits which have become historic. His lordship has supplemented these by a number of master works dating from the middle of the eighteenth century, and his contributions to the section would, if all were hung together, nearly suffice to cover one side of the room. The Corporation of Newcastle has lent its great pictures by Parker and T. M. Richardson. Important as the loan collection is, we yet think that our amateurs will find equal attraction in the room where the works of *Contemporary Foreign Artists* are exhibited. Here are shown some marvellous examples of Corot, including his famous "Awakening of Diana," and a battle piece, by Schreyer, round which crowds will linger whilst the Exhibition lasts. We believe that something like £1,800 is all that has been allowed from the funds of the undertaking for the expenses of its Art Department. The actual cost cannot have fallen far short of £3,000. Some enthusiast must be suffering financially in order to make this most attractive section of the Exhibition an unqualified success! and the public will be interested in learning the facts touching this self-sacrifice. We hope that no need may arise for such personal devotion to the cause, and it is not yet too late for the management to act liberally to the executive of the art section. It should be mentioned that the Hanging Committee, whose work is now quite completed, consists of Phil. Morris, A.R.A., A. H. Marsh, R.W.S., H. H. Emmerson, and Robt. Jobling. Mr. Thos. Dickinson has from the first been in charge of the business arrangements of the department. How arduous—and at times how unpleasant—the labours of these gentlemen have been the public can scarcely imagine. Space for the exhibits offered has been sadly lacking, and the exigencies of "hanging" have in many cases demanded a sacrifice of works by local artists in which talent was by no means absent. With regret the sub-committee charged with the task of selection has rejected a large number of pictures which they would gladly have placed on the walls had space permitted, and they have not always been successful in giving consolation to the disappointed artists desiring to exhibit. There has been a hardship here, for the annual show of the Bewick Club has been merged this year in the art display of the Exhibition, yet many works which would certainly have been accepted at the former undertaking have been squeezed out in the more important affair, and thus a number of aspiring young artists are left without any means of reaching the public at all. However, it is wrong for the disappointed ones to blame the hanging sub-committee for their troubles, and the lot of these gentlemen has for the last three weeks or so been far from a happy one. The task of arranging the accepted works has been very difficult, and we do not expect that the plan adopted will please everybody. Under the circumstances of this particular case, it was not easy to devise a system which should bring every picture under its proper denomination and at the same time enable the visitors to find something like consecutive order in the arrangement of the exhibits. As we have mentioned above, the annexe consists of six rooms, that is to say, three on each side of a longitudinal partition which divides it into halves. On entering from the South Court, the visitors will pass into the left-hand side of the entrance hall, and thence into the suite of three rooms in the eastern half of the building. These rooms will be numbered from one to three. From the last the company will move into the western half of the structure, the rooms in which are numbered four, five, and six, and the latter adjoins the "way out" side of the entrance hall, through which the South Court is reached again. In rooms Nos. 1, 2, and 3—the eastern half of

the building—are placed the works of British and Continental artists, which have been forwarded for exhibition and sale by the painters themselves. The three rooms on the western side of the annexe are occupied by the Loan Collection, in which, as far as possible, the paintings of the British masters are separated from those of the Continental artists. The latter are almost entirely accommodated in Room IV. An idea of the arrangement is to be gathered from the notes which we compiled when making the tour of the rooms on Saturday afternoon, in which promenade the reader may mentally accompany us.

THE ENTRANCE HALL.

It is not desirable that the visitors should linger in the entrance hall of the Art Gallery. The space at command is small, and a block of people would be readily caused if more than casual attention were paid to the works hung upon the walls. It is for this reason that the little chamber has been devoted to the exhibition of works in "black and white" and some few water-colour drawings. The great bulk of the examples on the walls have been contributed by the proprietors of the *Graphic* illustrated newspaper, and they are the artistic originals of some of the most striking pictures which have appeared in its pages. More than one northern artist of rank finds employment in contributing to this attractive journal, and the fact may not have been without its bearing upon the liberal manner in which its proprietors have responded to the appeal made to them on behalf of this Exhibition. On the left hand side of the entrance chamber are to be noted drawings for the *Graphic* executed by John Charlton (formerly of Newcastle), Staniland, Reinhardt, Small, Charles Green, G. G. Manton, B. Goddard, B. Barber, J. C. Dollman, R. Harris, Frank Dadd, and others. A few slight water-colours are hung upon the cross wall of the chamber, and the right hand (or exit) side is devoted almost entirely to etchings, which have been placed on view by our enterprising townsmen, Messrs. Mawson, Swan, and Morgan. Amongst these may be picked out a number of superb pieces, such as the Tintern Abbey and Hereford Cathedral of David Law; the river scene, with small craft, of Jas. McNeil Whistler; and the etchings contributed by A. Legros, R. W. Macbeth, J. J. Tissot, Seymour Haden, Paul Rajon, Herman Haig, Samuel Palmer, Debaines, E. Boulvin, Watney, &c.

THE FIRST ROOM.

Devoted to "Contemporary Art," the first room contains much to interest and entertain the visitor. The whole of the works hung in it have been contributed by the artists themselves, and with few exceptions they are for sale, the prices appearing in the catalogue. One of the first pictures which catches the eye after the apartment is gained is a large figure subject from the romance of "Don Quixote," painted by Professor J. E. Hodgson, of the Royal Academy. It can scarcely be said that the piece is presented to the best advantage as seen upon these walls, and indeed it is scarcely justice to the eminent painter that it should be so exhibited. Planned upon large lines and showing much flat treatment, the picture was intended for mural decoration—to be let into a wall or affixed to a panel—as tapestry or frescoes are placed. But here we have it framed and shown as an easel picture. But viewed with the artist's intention kept well in mind, it must be said that the work is one of the finest in the collection. Powerfully drawn are the figures, with the individuality of each subtly expressed, whilst the grouping is perfect. The knight of the doleful countenance is seated upon his sorry Rosinante, excitedly addressing the puzzled peasantry, whilst stolid Sancho Panza stands by giving his ass leave to graze. Many of our readers will be aware that Professor Hodgson is a native of Newcastle, and that he is a member of the family which at one time owned the *Newcastle Chronicle*. The picture to which we now draw attention is priced at £500. Close to it is a small single figure painted by W. Logsdale, the young artist whose contributions to the Academy Exhibition created so favourable an impression a couple of years ago amongst the critics. This little work is picturesque in conception and

beautiful in *technique*. The subject is a dark-eyed Oriental woman, whose flowing draperies are richly decked with coins and fringes. Near at hand is a large picture by H. H. Emmerson, entitled "Sea Birds," which we have seen on the walls of the Bewick Club's quarters. The piece represents a fisherman with wild ducks slung over his shoulders, and although it shows all the well-known artist's vigorous treatment and feeling for colour, we yet prefer to it one or two others of his works hung in the collection. Theatrical pieces are always attractive, even when executed with little skill, and thus many of the visitors to the section will pause before Ludovici's work which he calls "Behind the Scenes," the merit of which lies more in the selection of the subject than in its treatment. Three juvenile fairies are seen, arrayed in muslin and silver tinsel, waiting at the wings to "go on" in the performance of a pantomime. Gazing round at the bewildering masses of gilded frames and striking pictures on the walls, it is difficult to single out any single subject for special inspection, and, on the other hand, the time is not yet ripe for undertaking the laborious task of working our way through the exhibits catalogue in hand. At length one powerfully handled work makes its influence felt. It is a coast scene by J. C. Noble, A.R.A., and discloses a fine expanse of verdant sea banks, so skilfully treated as to avoid the monotony of too much pure colour, together with a stretch of silver grey sea, half hidden by light mists. A striking work this, and contrasting singularly in its solidity with the airy lightness of a painting by H. H. Emmerson, which almost touches it, and which bears the title of "When George III. was King." Eighteenth century manners and customs supply the incident illustrated by the worthy president of the Bewick Club. A pleasure craft floats easily down the current of the Thames, propelled by a gaily dressed damsel, who skilfully handles the sculls, whilst a gentleman, in wig and velvet coat, reads to her from a book, and marks the emphasis of his sentences by the waving of his white right hand. Different altogether in motive and in treatment is a glowing sea piece on the same line. This work is by Robert Jobling, who sees more distinctly the poetry and romance of a sea life than any other painter of our period. On this charming canvas—

Softly, faintly morning breaks in roseate streaks,
Like the first faint blush on a maiden's cheeks.

A grand sweep of slowly-heaving summer sea reflects the hues of earliest dawn. The distant coast shows in soft neutral tones. In front "the toilers of the deep" labour at their hazardous avocation. Little exercise of the imagination does it need to hear the grating of the cars in the rowlocks and theplash of water from the blades. How different is all the adoration of nature expressed in this work from the motive which animates the large figure painting that hangs by its side. "Mary in the House of Elizabeth" is the title of the picture referred to, and the Hanging Committee have done well to place it where it can be compared with the essentially English sea piece, for it is French in treatment of the subject and in the peculiar technical merits it displays. The two figures which appear in the scene are drawn upon a large scale, considering the size of the canvas. Shown to us as young and of chaste beauty, the white-robed Virgin stands with clasped hands receiving the homage of the grey-haired woman who kneels at her feet, whilst guardian angels, dimly seen, hover round her head. This excellent picture is the handiwork of Mr. James Clark, of Hartlepool, who was a pupil of the famous Gerome, and is a well-known exhibitor in Northern collections. Near at hand are fine works by Fred. Morgan, Buxton Knight, and Charles Wylie, over which we must not linger at present, but we find it impossible to pass over a carefully painted landscape by Yeend King, called "The Ferryman's Daughter." The artist brings before us a summer view of level country, with a sluggish river, and a luxuriant growth of rushes and aquatic plants, all seen in the soft atmosphere of a cloudy day. Amongst the thick grass by the riverside is seen the firm and well-set figure of the girl

who furnishes the title to the work, and the old ferryman directs his little craft towards her. There is a pleasant story to be gathered from the picturesque scene, and in all respects the work is that of a master. Passing by such well-known pictures as Goodall's "Puritans and Cavaliers" and Dendy Sadler's bright-toned and humorous "Gudgeon Fishing," we pause for a moment to admire Mrs. Louisa Jopling's carefully-painted work, named "Broken Off," and to notice the sentimental "Bridge of Sighs." The latter shows a weari'd flower-girl asleep in a recess of Waterloo Bridge at daybreak, with her unsold wares scattered round her. It is bad in colour, and is far from being the most touching of the incidents which have been imagined of this resort of despairing suicides. Frank Walton's familiar landscape, "Southward from Surrey's Pleasant Hills," with its glowing atmosphere and grand masses of woodland, detained us for a moment; we pass on to admire the vigour and picturesque feeling of "Fortune Telling," a picture by Miss Thompson, of Cullercoats, and to examine closely a small example of McWhirter, entitled "The Old Mill on the Doon." Then we note Fred. Morgan's brilliant work, "Tally-ho!" which has been made familiar to everybody by the *Graphic* presentation oleograph from it, and we make memoranda for future use touching Hodgson Campbell's "Under the Coaly Tyne," a picture which will attract as much attention as any other in the room, if only through the peculiarity of its subject. The rising young artist shows us a pitman working in Redheugh Colliery, far beneath the bed of the flowing river. Lying prone on the floor of the working, with his muscular arms and shoulders bare, the miner is represented as "kirving out a back-end," and the only light thrown upon the weird scene comes from his lamp, which is correctly placed well away from the swing of his pick. For the moment passing the doorway which leads into the second room, we notice a lovely view of Bordighera, on the Italian Riviera, by Carl Schloesser, and near it an important landscape with figures by Arthur H. Marsh, R.W.S., demands attention. Mr. Marsh's picture is the best example of his work which we have seen, and it impresses us as being one of the most striking paintings in the room. It is called "Stony Land," and discloses a field of turned-up soil, from amongst which a band of women are gathering the pebbles. Types of female workers on the land, with bent backs and sun-browned arms are grouped upon the canvas, and the composition is very good, whilst the entire picture is painted in the low and sweet tones which the artist so often pleases us with. A gorgeous military piece, "Marshal Keith's Last Battle," shows well beside this fine work, and, if we remember rightly, Mr. Patterson's picture was similarly well placed at the Edinburgh Exhibition. A more charming milkmaid than the one shown in the painting named "Over the Downs" is not often reproduced on canvas, and perhaps there may be visitors to the Exhibition who recognise the face of the brown-eyed damsel. Difficult do we find it to leave with merely a passing glance the gorgeous display of pink and white apple blossoms shown in Miss Mary L. Breakell's "Devonshire Orchard," and equal self-denial has to be exercised in regard to the brevity of our inspection of Ralph Hedley's good picture "Darby and Joan." George Aikman's study of "Scotch Firs," Frank Dadd's wonderful duel scene called "The End of the Game" and J. M. Brown's "Lucy's Flitting." A portrait of a Catholic Monsignor, by Niels M. Lund, is good as the production of an Academy student, and as we continue our rapid glance round the walls we note that a large and important picture of the Dutch school has been hung amongst the contemporary sale work. This piece is a study of humble life, called "Bedtime," by Albert Newheuys, and like most of that great artist's productions, it is painted in low tones, and is very closely finished. Comparison with it is invited by a beautiful work of the Scottish school, hung close at hand, and suggestive of the strong influence exercised by Paul Chalmers. Abercrombie—one of Newcastle, but now of Edinburgh—is the painter of this picture, which is entitled "A Little Bit Jealous." The

scene represented is a humble interior. Granny has upon her knee the latest addition to the family, and a yellow-haired lassie of some three or four years old is unquestionably "a wee bit jealous" as she views the infant in full possession of the rights and privileges hitherto exclusively hers. One of Ralph Hedley's most successful pictures is hung in this part of the room, and it should be viewed. The subject is an old man teaching his grand-daughter her letters—it is called "A. B. C."—whilst a dog pays strict attention to the painfully tedious procedure. Seldom has the Newcastle artist placed upon canvas figures more strikingly characteristic than these, and the story of his picture is well told. An excellent example of T. R. Spence is his "Grief of Gudrun over Sigurd Dead," which shows alike the excellencies and eccentricities of the romantic school. In colour the work is beautiful. The figure of the dead knight resting on his bier is marvellously impressive, and the appointments of the room are effective and correct. But the figure of Gudrun is open to criticism in regard to its drawing, and to us it appears to be out of proportion. Leaving a number of good pictures unnoticed, we turn from this most interesting part of the collection, and proceed to

THE SECOND ROOM.

Skied, above the entrance door, is a fine work, "Babes in the Wood," by Mrs. Louisa Jobling, which will repay the risks of a crack in the neck incurred by those who would inspect it. The picture is solidly painted, and the lost children—more especially the spirited-looking boy—are well imagined. Within a few square feet of the entrance door, the walls are hung with pictures of great merit. For instance, there is Robert Jobling's "Signals of Distress," considered by a majority of the local critics to be the best work he has painted. Good as the picture undoubtedly is, this is an opinion which we do not share. A stormy day at Cullercoats is the scene delineated. Signals of distress have been seen "outside," and the lifeboatmen are launching their trusty craft. Spindrift is flying everywhere, and blinding showers are driving before the gale, but the fisherfolk are crowding to the look-out station and to the cliffs which overlook the haven. Jobling has been marvellously successful in depicting the excitement of such a moment, and there is power and close observation in every detail; but all the same, we think that this department of marine painting is not the one in which the eminent artist is seen to the greatest advantage, and Sir William Armstrong possesses a moonlight picture of his which we prefer to this. One of the ablest and most rapidly improving of our local amateurs, Mr. Frank T. Carter, of Gateshead, shows a landscape in this choice corner of the room. The subject treated is a view of "The Vale of Aln from the Mount, Alnwick," and a finer example of Mr. Carter's mastery of colour and careful finish we have not seen. It is not quite put out of countenance by the great picture of the Chateau Gaillard, by David Murray, which closely adjoins it, although it must be said that the Scottish academician's canvas is one of the noblest that figures in this section of the Exhibition. Charles Richardson's "Tynemouth Pier" also survives the ordeal of contiguity to Murray's magnificent painting. The local artist depicts with spirit and power a scene which is familiar to many of us, but the grandeur of which never suffers diminution. A heavy sea is running off the mouth of the Tyne, and as the mighty waves strike the North Pier they are driven to a height of twenty feet or so above the massive stone roadway, and fall in showers of milk-white spray. Just below this clever picture is hung one of the finest Aumonières seen in the North. "Water Lilies" is the title of this lovely landscape, in which we see a pool overgrown with blooming water lilies and rushes, with far-stretching meadows beyond. It is impossible to convey in words the slightest idea of the fine colour and breezy freshness of this superb picture. Local interest attaches to another noble work, entitled "Echoes," hung in this part of the room. A sea-nymph reclines on the bright sands of a rocky cavern, and listens to the murmurs of a shell which she holds to her ear. Although the subject is a study of the nude, the British matron will not be shocked at it. There is

not a particle of grossness in the idea which it illustrates, and as art, the chaste outlines of the figure, the listening face, the lovely flesh tints, and the cool hues of the sand and rocks enchain the attention. George Morton, who is responsible for the picture, was at one time a student in the Newcastle School of Art, but he won a scholarship, went up to the National Training School, at London, and is now one of the teachers on the staff of that institution. The only fault which can be found with his sea-nymph here exhibited is in the drawing of the hand on which she rests: it appears to be too long. Keeley Halswell's "Loch Maree," a fine example of that artist, deals hardly with the minor works in its neighbourhood, and we look at nothing else until reaching a large picture (209 on the catalogue) named "A Storm Coming On." This power may be termed "an agony in brown" as in sober hues are depicted trees, roads, and fields swept and torn by a raging tempest which seems to be driving everything before it. Ralph Hedley, who is well represented in the collection, exhibits here one of his best paintings of dogs. It is called "Ready for a Stroll," and shows a noble St. Bernard and two excited terriers waiting for their master to take them out. Another large picture by the same artist, entitled "A Dull Market," is a Saturday study from amongst our bird fanciers. The rough figure of the man in greasy corduroys who seeks to vend a basket of poultry is one of the most striking that Hedley has ever drawn, and unquestionably it has been taken from life. Upon the same line as this piece is a Venetian view, by Baden Powell, in which the sunset effects are accomplished by such a blaze of crimson and gold, on sky and water, that the eyes ache after looking upon it. A noble picture, "Buondelmonti's Bride," by H. M. Paget, is hung in this part of the room, and visitors who have previously seen it at Liverpool, Newcastle, and elsewhere will yet admire it. On the western side of the doorway is a large picture by H. H. Emerson, called "Children of the Mountain." This is the most successful work that the artist has sent to the Exhibition, and his old patrons will inspect it with pleasure. The subject is a milkmaid and a group of young calves. Painted on a large scale, the figures stand well out, and the work is altogether strong and effective. Fine portraits of William Morris and Robert Browning command notice as we make the circuit of the room, and there are two other works in this vicinity which it is impossible to hurry past, namely, Alfred East's well-known "Dark Island," and a portrait of a little girl by Mr. Charles Mitchell. The last-named must be admitted to rank as one of the gems of the collection, and as worthy of the artist who painted the famous "Hypatia." Next we notice a small landscape, "Twizell Bridge," by McWhirter, and a grand picture, "The Seaweed Harvest," by Henry Moore. Finally, we reach a large piece by Walter Crane, entitled "The Fate of Persephone." Everyone knows the peculiar style in which it pleases this gifted artist to embody his ideas, and it will suffice to mention the picture as in all ways a typical specimen of his productions. We hear that it was, unfortunately, injured when first brought here to be hung, and considerable trouble and some cost have been incurred in making the needful repairs. No sign of the mishap is now visible.

THE THIRD AND FOURTH ROOMS.

The bulk of the water colour drawings are hung in these two small apartments, and for the moment we must be permitted to pass them over with the briefest possible comments. Amongst them we notice works by J. M. W. Turner, Birket Foster, some fine specimens of Copley Fielding, Old Danby, De Wint, William Hunt, John Storey, Robson, of Durham (represented by a glorious view of the city of York), Paul Naftel, W. B. Scott, Boyce, Albert Goodwin, Edward Swinburne, T. M. Richardson, sen. and jun., and Alfred W. Hunt (a view of Durham City, which has recently been shown at the Berlin Exhibition, and is lent by Mr. Barnes, of Durham). The drawings in Room No. IV. are in nearly equal proportions contributed by the artists who painted them and appertaining to the Loan Collection. In Room No. III. there are about thirty water colours which are still the property of the artists. There are several oil paint-

ings here which cannot fail to attract the visitors, notably a moonlight view of Cullercoats Haven by Robert Jobling; a brilliant view of the Flower Market at Granville, France, by E. H. Hunt; two pictures of French circus incidents by Tissot, and Hodgson Campbell's highly-praised Academy picture of last year. This work is called "Daddy's Dinner," and shows a cheerful labouring man enjoying the humble mid-day meal that his two little daughters have brought him. Very bright and light in tone is the colouring, and, unfortunately enough, the picture is hung by the side of one of Miss Montalba's figure pieces, which is so strongly painted as to affect it very much. Two military subjects by Percy Emerson are striking, and there is attraction also in a horse incident painted by Wilson Hepple, and in a rich-hued view of Windsor Castle (sunset and moonrise) from the easel of John O'Connor, R.H.A. A portrait of Mrs. Isaac Walton by Geo. Walton also commands attention, albeit it has been skied, and is a very fine example of that accomplished artist's work.

THE LOAN COLLECTION.

Public interest in the Art Gallery will possibly centre in the loan department, which displays an important collection of masterpieces painted within the last century. We have explained above how it comes to pass that the Duke of Northumberland's exhibits happen to infringe the rule laid down as to time, but as it happens his grace's valuable series of contributions introduce nothing incongruous into the collection. The works, some six or seven in number, are placed altogether amongst the foreign collection in Room VI., and they are most attractive. Scarcely possible would it be in a hasty glance through the rooms such as we are now contriving to dwell at large upon a mass of some four hundred exhibits, most of which are familiar to all the critics, and occupy well-defined places in the history of art. We will, under the circumstances, merely mention the works which we noticed as we walked through the rooms. Close to the entrance door of Room V. is H. P. Parker's "Sandhill Wine Pant," and below it is the portrait of Curran, painted by Sir Thomas Lawrence, and now lent by Earl Grey. The Earl of Durham's sixteen pictures are variously hung. The celebrated portraits by Sir Thomas Lawrence are well placed, and no visitor is likely to pass carelessly away from the eloquent face of John George Lambton or from the charming presentment of Master Lambton, in his rose-coloured velvet suit. Nor will an extraordinary landscape by Collins, in the Lambton collection, be neglected by the amateurs. A portrait of Annie Bellingham, painted by Angelica Kaufman, is lent by Mrs. Blackett-Orde, and Mrs. Parker, of Gosforth, contributes a superb sunset piece by Danby. Conspicuously hung in the central space of the western wall is a magnificent picture by Watts, entitled "Love and Life." A finer example of this great artist has never been seen in the North. Mr. Alexander S. Stevenson, of Tynemouth, exhibits an important sea piece, by Colin Hunter, called "Trawlers Waiting for Darkness." Mr. J. J. Colman, of Norwich, whose hospitality was enjoyed by so many of the visitors to the Royal Show last July, lends a fine example of Old Crome, "Bruges by Moonlight." We notice two smaller works by Watts, forwarded by his agents—the artist is himself sojourning at Constantinople just now—namely, a lovely "Cupid" and an allegorical piece called "The Birth of Eve." Mr. Henry T. Morton, of Biddick, forwards a considerable number of works, amongst which a landscape by Linnell is conspicuous, and an Eastern view, by Goodall, with shepherdess and sheep, also commands attention. Almost in a corner is a fine portrait of Sir John Edward Swinburne (the sixth baronet), by Gainsborough. The famous "Last Sleep of Marie Antoinette," by E. M. Ward, R.A., is contributed by Mr. James Hall, of Tynemouth, and its pathos will strike home here as it has done elsewhere. The Corporation of Newcastle show T. M. Richardson's invaluable delineation of the High Sheriff's Assize Procession *en route* down the Side to meet her Majesty's Judges, and Parker's "Fancy Dress Ball at the Mansion House." The sixth room contains the foreign

loans, including the great collection of Corot's works, and fine examples of Troyon, Daubigny, Tissot, Rousseau, &c. Here also are the two pictures lent by her Majesty, viz., Zoffany's "Florence Gallery" and Mulready's "The Wolf and the Lamb."

GOOD.

One of the finest works in this department is a little portrait of Thomas Bewick, by T. S. Good, of Berwick. Northern art is well represented by this production, even amongst such masterpieces as surround it. We are shown the great wood engraver seated cross-legged in his chair. Meissonier has shown us no closer finish or firmer grasp of character in his gems of portraiture than is disclosed in this picture, which is emphatically a great work. The painting of the face is marvellous in its minuteness and refinement, and every detail of dress is brought up with the finest possible effect. By the public generally the Berwick artist is scarcely known even by name, and yet he was entitled to rank with the greatest of his time. Born towards the close of the last century, Good flourished between sixty and eighty years ago. He was well acquainted with the Newcastle engraver, and the portrait of Bewick, lent by the Natural History Society to this collection, was painted in 1826 at the old man's house in Gateshead. Bewick died in 1828, and the picture became the property of his daughters. Good served his time to be a house painter in Berwick, but early showed great talent as an artist, and for about ten years he exhibited successfully, and obtained excellent prices for his pictures. But about 1830, from some caprice, the reason of which can only be guessed at, he resolved to paint no more, and he kept his word. For over forty years he lived as a private gentleman—he was in comfortable circumstances—without putting brush to canvas, and he died at a great age in 1872. The portrait of Bewick exhibited in this collection shows how wonderfully fine were his gifts of *technique*, and upon this point it may also be mentioned that four of his works are hung in the National Gallery. We believe that Mr. Barnes, of Durham, has collected some eighteen examples of the Berwick artist, and that he intends to publish, at some future day, a detailed biographical notice of him.

THE NORTH GARDENS.

A month ago the enclosed ground at the north end of the Exhibition was a scene of confusion and disorder. To-day it is an elegant region, with well formed roads, grass lawns, flourishing trees and plants, beautiful buildings, and almost all that is calculated to lead to outside enjoyment. At the bottom end there are goods and merchandise to inspect, in the centre the eye takes in the places of entertainment, and at the higher end dozens of waggon of all kinds and all colours in full operation give life and interest and variety to the scene. In fine weather the North Gardens will probably be amongst the most popular of places to thousands of people.

THE OLD TYNE BRIDGE.

Over the old Tyne Bridge will be one of the rambles no one will be inclined to forego before leaving the Exhibition. The quaint old structure is like a spirit of the past standing forth amid much that is bright, new, sparkling, attractive, and modern. It is the first great object that comes into view when the North courts of the Exhibition have been left; it is the one object that greets the eye in whatever part of the grounds the visitor may be, and it will provide interesting matter for conversation. Newcastle people have been privileged occasionally to see representations of the old Tyne Bridge as it stood in the days of good Queen Bess. The representations have generally shown houses towering above the structure spanning Tyne stream, clearer and shallower than it is to-day, and breasted by vessels of a pattern long since banished and obsolete. Gardens there were then on the Gateshead side, while at Newcastle one can trace on those famous coloured prints, with which many of us are so familiar, the old town wall of Newcastle stretching along the Quayside, running up the Causey bank encircling the town, and speeding off in a westward direction. Pandon, at that

time boasted few possessions, the ground in front of the castle was open and pleasant, orchards stretched up from the Close to far Westgate, and rural and snug the whole town from the Sandhill to the Castle Leazes lay visible from one end to the other. The picture was representative—just as the old bridge at the Exhibition is—of that time when Elizabeth reigned, when Mr. Fiddas lived on the north end of the bridge, and when Mr. Peter Weatherley, a shoemaker; Mr. Christopher Byerley, a hardware-man; Ann Tinkler, a dealer in stuffs and checks; Mr. John James, a cheesemonger; and Mr. Thomas Patten, a mercer, all did business on the venerable structure. None the less earnestly was business done in those days, but what a change in the volume of traffic. No High Level Bridge, no Redheugh Bridge was dreamt of then, and the way into Newcastle from the south was down that old Bottle Bank—which a Yorkshire exhibitor at the present Exhibition described in a Newcastle tram-car the other day as something awful in its steepness—across the old bridge, past the old-fashioned Sandhill, with its quaint Guildhall and Maison de Dieu, and over the Lort Burn bridge to “the town,” which was then practically the Castle Garth, the Side, and a small portion of the east end. You could dream over the picture, and more particularly could one dream over the bridge, of a time when Tyne commerce and Newcastle business were in their infancy. The lady in patterns would wend her way at such a time to the shop of Ann Tinkler, not to gaze at the shop windows on her way as you fair readers are accustomed to do, but to greet the shopkeeper—history saith not whether she was a dame or a miss—with a hearty good morning, and then she would doubtless proceed to scan the “stuffa and the checks,” which in the absence of the “hyem-spun” article were to do duty in the family. If there were maskers in those days, and we may be sure there were, honest Thomas Patten would doubtless be their man. Peter Weatherley to many of the inhabitants of both Newcastle and Gateshead would supply the rough, serviceable boots and shoes that were in vogue at that time, while the joiners would buy from Kit Byerley, the time-honoured hammer, the big nails, and the still larger staples that were wont to be used on the substantial rafters of the long ago. American cheeses were unknown then to our countrymen, but one can well conceive that Mr. John James had cheese-tasters every now and then in front of his funny little shop, smacking their lips at his wares, passing comments on their quality, or exchanging with one another, in that hearty old manner our forefathers possessed, the civilities of the day. Newcastle was small; Gateshead was smaller. But, despite the smallness of both towns, a busy old place was the Old Tyne Bridge. Utility and defence formed the supreme thought evidently in its construction, the preservation of the peace, the establishment of communication between the banks of the Tyne, and the punishment of evil-doers were the leading ideas in its maintenance. Its houses and shops supplied the wants and met the requirements of many persons, its towers and gates forbade that destruction which a sudden surprise of the enemy in the rude times of the 13th, 14th, or immediately succeeding centuries might occasion. There was the Gateshead Gate commanding the entrance, and what was known as “The tower of the bridge,” though it was later on called the prison tower, and into this the lewd and disorderly were hurried, while old-fashioned shopkeepers popped their heads out of doors to look on, and their customers gossiped—there were ever gossips—on the character of the offences. Juvenile Newcastle and Gateshead—undisturbed and undistracted yet by the existence of School Boards, “Evenin’ Kronikils,” or “wax leets”—followed in rag-tag and bob-tail order in the wake of the stalwart town sergeants. Attracted by the tumult above the old Tyne, keelmen would gaze up from the bosom of the stream below to witness the hubbub, while the P.D., who, if local tradition and verse is to be believed, was always in mischief or trouble himself, would doubtless commiserate with the offenders. But history goes back to a time of still greater importance, to that year of 1305, after Wallace had been executed in London, when a right-side quarter of that undaunted Scotchman was exposed on the bridge for Northern

traitors to gaze at and tremble. It is believed, too, that in 1408 a quarter of the body of Henry, Earl of Northumberland, who was slain at the battle of Bramham Moor, was exposed on the same place to a similar indignity. Built in the 13th century, and immediately succeeding the Roman structure that had stood so long, the old bridge braved the storms of nearly five centuries, and stood unshaken until that dread night in 1771, when Father Tyne rose in his fury and swept away the middle arch of the bridge, with two others on the Gateshead side. The house of Mr. Thomas Patten, mercer, was “swept bodily down the river as far as Jarrow Slake, where a dog and cat were found alive inside, after having made the rough voyage of the river for somewhere about nine miles.” That flood and the sudden destruction it wrought was virtually the end of a structure which had in all truth served its day and generation well. Nothing could have been happier in its conception than the idea of reproducing at the present Exhibition the old bridge which had done such faithful service to so many past generations of Tynesiders; and no idea could have been more faithfully carried out. It has been constructed from designs furnished by Mr. Messent, engineer to the Tyne Commissioners, and all the old historical authorities and engravings have been consulted on the subject. The reproduction in length and height is on a scale of two-thirds of the size of the actual structure; the width, however, has not been much reduced, and the appearance of the bridge spanning the lake in the North Gardens presents about the same aspect as did the old Tyne bridge at half tide. It is a structure of nine arches, three pointed, six segmental. The total length is 395ft., the largest span 36ft. 8in., width between parapets 15ft., between houses 9ft., and the smallest span is 17ft. 4in. There are 18 houses on the Bishop of Durham’s property. The highest point on the structure is the top of the prison tower, which is 43 feet above water mark. On the magazine tower there is to be a statue on one side of Charles the Second, a *fac simile* of that now in the Guildhall, with the royal arms above. On the other side is the date, cut out, to all appearances, in stone, 1636. The town’s arms, carved, appear on the prison tower. On the Gateshead tower are the arms of the Bishop of Durham as Prince-Palatine. Quaint and picturesque, as all who have seen it have declared it to be, is this remarkable production to the eyes of the visitor, as he leaves the main court of the Exhibition, and strolls up the slight ascent to the Gateshead tower. He is entering, be it remembered, at the Gateshead end and finds himself confronted by an avenue of ancient shops. Old London and Old Edinburgh pale in interest before the spectacle exposed. It is a *fac-simile* almost without alteration of the old world gables and roofs, the little windowed shops, and the narrow doors of long ago, surmounted by towering storeys, from the windows of which neighbours could hand to each other—as was then the custom—loans of household requisites, or from which they hung out their clothes to dry on the same class of cross-sticks which are stretching out to-day above the heads of the visitors. The old shops and houses, not unlike what may yet be seen on the Castle stairs, were of brick covered with plaster; and the builder of the exhibition Tyne Bridge has not overlooked that fact, for the plaster is to all appearance knocked off at some parts, and the bare bricks are striking through. It is no wonder this was the case at the Gateshead end, for the place was narrow, and it is narrow. As the crowd moves on, it will pass “Ye Old Newcastle Fayre,” shops Nos. 1, 3, 5, and 7; “The Neutral Zone Swiss Bazaar” of Mr. Bernasconi; “Ye Fancy Goods Store” (Mr. Barker, Glasgow); “Ye Bible and Crowne,” or the bookseller’s shop kept by John Cochrane, “successor to Robert Akenhead”; “Ye Sunlighte Soppe” shop; “house of Dick Turpin,” at which the handsomest young lady of Newcastle is asked, per advertisement in the *Chronicle*, to preside; and the premises occupied by Messrs. Jacques, London; Poole and Co., Edinburgh; Henderson, Edinburgh; Mackie, London; Salte and Co., London; Stenning and Co., London; and Robertson, Edinburgh and Paris. The old places, in short, are peopled with tradesmen of the present. There are

toys, fancy goods, books, and stationary of all kinds, to appeal to the pockets. Stretching forth from the quaint cluster of shops, the many-coloured stripes of the barber's pole indicate where a cool wash, a shave, or requisite attention to the hair can be had. There is more room, however, between the shops and the prison tower; for the road gets wider, the bridge bays out at each side, and the visitor is at liberty to breathe freely once more. In the old chapel close to, which is traced to the time of Charles II., Lady Ravensworth and other benevolent ladies are holding a bazaar on behalf of a really laudable work—a home for fallen women. The prison tower must be inspected by all. Within its walls the visitor will find the works of that fine large clock, the dial of which he has seen from the outside. He will find here also a peal of eleven massive bells, with clever intricate automatic machines to work both the bells and the clock. All these articles are supplied by Messrs. Gillett, of Croydon. The bells will chime the quarters, strike the hour and play tunes. Mounting up above the belfry on to the roof with the castellated walls, the curious may enjoy pure air and the glories of a scene which cannot be very well described; for the Exhibition grounds, the Town Moor, the slopes of Gateshead, and the surrounding country for miles around are all to be seen. The magazine tower at the Newcastle end has been taken by the Mayoreess of Newcastle. One of its apartments will be used for a committee room for ladies, and the other will be granted as a resting-place for young persons engaged in the shops on the bridge. Passing, as he probably will with regret, down the declivity at the other end, the visitor finds that the old bridge is inspected, and he is once more in the midst of the pavilions in the north ground. In preparing the designs of this attractive structure, it is but justice to state that Mr. Messent had the aid of Mr. Laws, city engineer, Newcastle, and of Dr. Bruce. The bridge was commenced only in January last, but large bodies of men were from the first employed upon it, and that it has been substantially built is evidenced by the fact that upwards of 24,000 cubic feet of timber have been employed in its construction. Mr. Walter Scott, Newcastle, has been the contractor. The Willesden Paper Company have supplied the covering to the timber, and their representatives here, Messrs. R. and W. Bucknall, architects, furnished the ornamental detailed drawings for the shops and other buildings. The painting has been done by Gullachsen, Pilgrim Street, and the whole work has been carried out under the daily and painstaking supervision of Mr. W. L. Charlton. It is a strong, substantial production, quaint, picturesque, interesting—a representative not only of the Old Bridge, but of old chalets with which the neighbourhood abounded, and no visitor to the Exhibition should fail to see it. We have omitted to mention that the old Blue Stone may be found in its place on the bridge, while below, on the bosom of the lake, the old Tyne lifeboat, which has saved upwards of 1,000 lives, will be exhibited. All the carved work is by Mr. Hedley, New Bridge Street, Newcastle, while the handsome stained glass in the old chapel is by Atkinson. During the daylight on Saturday, after the water had been let into the lake, the Old Bridge had a real and fascinating appearance, and it will look equally well at night time when the shops are illuminated, and when the electric light supplies a moonlight lustre to render its romantic aspect still more complete.

THE MODEL COAL PIT.

Crossing from the North Court to the other side of the road in the North Gardens, those who desire to see what mining life is, or would like to know how faithfully a real pit can be represented, should make for the model coal pit. It is situated at the very commencement of the ground. To the pitman and non-pitman alike this must be a very interesting place. The visitor enters by a doorway, and, passing by black walls, finds himself, after he has "got his eyes again," at the bottom of the shaft. The cage with which he is supposed to have descended is hanging at this point. The other cage is at the top of the shaft; while, down below, the reality of the thing is carried so far that there, beneath the cage, one may

discover the actual sump. The shaft bottom is well lighted up by electric lamps, the forms moving about may be readily accepted as those of men engaged in mining, the hiss of machinery and the rumbling of the waggons fall on the ear, and the scene and the noise is similar to those found in any large Northumberland colliery. The cages—full-sized—together with the guides and iron rods, have been lent by the Cowpen Coal Company. Leaving the shaft, we note the compound hauling engine, lent by Messrs. Fowler and Co., which is working an endless rope on the engine plane 150 yards in length. This rope is lent by Messrs. Dixon, Corbett, Newall, and Co., Gateshead, and it is used on a system ordinarily adopted at northern pits. The tubs run at intervals of about 25 yards each, they have forks on the top, and these detach themselves automatically from the rope at each end of the plane. If, standing a short distance from the pit bottom, the visitor peers up the engine plane, he will see the handsome new tubs lent by Messrs. Joseph Cook and Sons, Washington, Durham, moving along rapidly through semi-darkness, past long black walls and black roofs, terminating in an opening which seems, if not as small, at any rate as far off as the opening that Sinbad is said to have discovered when imprisoned in the cave. In close proximity to the hauling engine a Schiele fan and engine, lent by the Union Engineering Co., Manchester, are briskly at work. The fan is intended to ventilate the pit, and is supplying a current of air at the rate of 50,000 feet per minute. In the fan house we may also see the electric generators, the patent of Messrs. Clarke, Chapman, Parsons, and Co., Gateshead. They are in duplicate form, and each is capable of lighting about 60 16-candle power incandescent lamps. After leaving the engine rooms, the way is past the engine plane, up the travelling way until the landing is reached. The plane, it should be said, is connected, from end to end, with electric bells, to establish communication between any point in the plane and the hauling engine man, which is effected by simply pressing the wires together. Telephonic communication is also supplied between the two termini. Both of these apparatus are lent by Messrs. John Mills & Son, electrical engineers, Forth Street, Newcastle. The pit timber—and you meet with it at every part of the journey—is principally lent by Messrs. John Hunter and Co., Quayside, Newcastle; but a portion of it is also lent by Mr. Thomas Atkinson, Maritime Buildings, Quayside. The long lines of rails are lent by Mr. James Watson, of the Close, Newcastle, and the flat sheets are supplied by the Weardale Iron and Coal Company. Messrs. Dunford Brothers lend the automatic greasers used in the engine plane. The road is now round a curve, the tall seam is left behind, and we come to a "fault" or "trouble," which cuts through the coal and throws the seam down about 20 fathoms, bringing the "yard" seam down to this level. This seam is thin, and the long-wall system of working is here exemplified. It consists in taking all the coal out in one long face, leaving pack walls or pillars of stone at intervals between roads and on each side of the road to support the roof. We are "in-by" now, among the coal workings, giving some idea of the scene in which the miner, half naked, is accustomed to earn his bread, but giving no idea of the discomfort. Owing to the coal being thin, the top stone is supposed to be shot down to make height, the stone so obtained being used to make pillars in order to support the roof. It does not require a very close inspection to see that this has been done at this point. Further on, again in the big seam, the system of board and pillar working is shown. A "jud" has just been shot down, the coal is lying strewn about, and the back end of the roof is standing exposed to view. In another place the board and the wall are down, one curved only, and the other both nicked and curved. At various parts of the pit tubs are to be seen, some ready filled with coal to be sent to the bottom of the shaft, others empty and waiting to be filled. The "broken," or pillar work system, shows us where the coal is being taken out bodily by lifts, and a portion of the goaf is here seen, where the top is supposed to have fallen in. Before we take another of the numberless windings of the

place, we note the post and stall system, so much in vogue in the Midlands, the galleries at regular intervals, the pack walls of stone, and the roads on each side, connected with the system. We then turn our backs on the face of the coal, and are in the "return," along which passes the air that is drawn up the upcast shaft; and, this traversed, an exploration of the pit is at an end. Fortunately, visitors will not need, as is the case down ordinary mines, to carry lamps, for about 50 incandescent lamps are lent by Messrs. Clarke, Chapman, Parsons, and Co., and Mr. Clifford, while different kinds of safety lamps are shown by Messrs. John Mills and Son. The whole of these are placed at different parts of the mine, and they rob the interior somewhat of that gloom that would otherwise prevail. The total length of the pit and workings is, from end to end, about 600 yards, the height is 7 feet throughout, and the width is from 7 feet to 15 feet at the widest part. It should be stated, for the information of visitors, that at various parts escape doors are provided, indicated by a red lamp above each, and through these the visitors, in case of too great a crush or any emergency, may get out into the open air. The pit has been in course of construction for several weeks, under the almost daily superintendence of Mr. G. B. Forster and Mr. A. M. Potter, assisted by the officials of Shire Moor and Cowpen Collieries. It is in all respects as perfect a model of a real coal pit as could be desired, and conveys all the features of an actual mine, with the exception that the water underfoot and the occasional dripping from the roof and walls are wanting. But these are deficiencies no one will regret. Leaving the coal pit, the visitor carries away the remembrance of curious turns, of elaborate machinery, of effective mechanism, of black walls, of electric lights in the darkness, and of places that Wilson must have had in his mind when he wrote in the "Pitman's Pay":—

In by they bumm'd me in a crack,
And left me i' maw father's board,
Where was bumm' at a back
As hard as whinstone, by the Lord.

THE HAULAGE SYSTEM.

One of the ideas that first led to the notion of the present exhibition was a desire to secure exhibits of the most modern and useful inventions in connexion with mining. That idea has never been lost sight of, and this fact is demonstrated by the appearance of the open space at the top of the North Gardens. This place is devoted to an exhibition of the various haulage systems used in the mines. It is scarcely necessary here to give a detailed history or account of the systems used, for they are pretty well known to all concerned in pit working or colliery management. It may be said, however, that the use of horses for haulage is rapidly passing away, and is being superseded by mechanical means which lead to increased production and to a lessened expense. How this is done, the visitor who takes his stand at the top of the North Gardens will learn, if he watches carefully the various systems that are at work, all on different lines and all driven by steam machinery. A more interesting sight to the mechanically disposed could indeed scarcely be seen, and wonder will be expressed at the automatic manner with which the tubs attach and detach themselves from the ropes, and take the curves which have been provided. The main and tail rope system is shown by the Hetton Coal Company; the endless rope system on top of tub by the Seaton Delaval Coal Company; on the side of tub by the Bedlington Coal Company; ropes underneath the tub by the Whitburn Coal Company, Hodbarrow Mining Company, Cumberland, and the Castle Eden Coal Company. Other systems are shown by the Moresby Coal Company, Limited, Whitehaven, the Tredegar Iron Company, and the Tyne Coal Company, Limited. For other particulars regarding these very interesting exhibits and their accessories, the reader may be referred to the official guide.

THE MODEL LEAD MINE.

Not far from the coal mine, the visitor will be struck by a substantial stone archway, bearing the words overhead,

"Model Lead Mine, Royal Jubilee Adit." This is the entrance to the lead mine, intended to show the practical way in which lead ore veins are worked. The interior is as interesting as the coal pit itself. At all parts wood and stone play a prominent hand in the work of construction. The sides and the roof and the main levels are built, more or less, of these materials. There are the shaft and the cross-cuts, the cage-way and the cages, the pumps for raising the water met with in the deeper workings, and the ladder or climbing way for the workmen passing to or from their work, and used also for ventilation purposes. In the coal mine we perambulated flats, but here we have the flat and the incline, the "vein stuff" or deads, the Jack-roll and the kibble, and the tubs which are necessary in the working of a lead mine. Mr. Bewick has superintended the construction of this interesting mine, and, next to the coal pit, it will be found to possess the greatest attraction for many visitors. There is communication between the lead mine and the coal pit, and the visitors may pass through both before going out into the open air.

MILITARY WORK.

Passing away from the north end of the Tyne Bridge, and leaving the pavilions to the right, an inspection should be made of the bridges erected and the battery formed by the members of the Newcastle and Durham Engineer Volunteers, commanded by Sir C. M. Palmer. These are places which the Duke of Cambridge will, doubtless, regard with attention, and they deserve more than passing notice at the hands of others. "Our citizen soldiers" have been indefatigable in their work, and the result of the efforts made during many evenings and Saturday afternoons is the formation of a military bridge over the lake 70 feet long between perpendiculars and about 100 feet long in all. It is built of spars of timber. Not far from this there is also a bridge of casks, and away north across the old ditch there is a bridge of trestles. The three bridges are typical of the resources adopted by the Engineers in times of real warfare and in cases of pressing emergencies. Not far from the bridge a siege gun battery, the outcome of laborious and extensive trenching, has been made. It is a double battery with underground passage, magazine, and guns complete, and, with the bridges, it is creditable alike to the industry and efficiency of the local Engineers and their officers.

AMUSEMENTS.

An electrical railway, commencing at a point level with the entrance to the pit, runs up behind the Lockhart and other pavilions, turns to the left, and terminates near the upper part of the old reservoir. A tramcar is provided capable of carrying 48 passengers, and the motive power is supplied by a 20-horse motor. The line is one-third of a mile long, and the car will be propelled at the rate of 12 miles an hour. Messrs. Woodhouse and Rawson, 11, Queen Victoria Street, London, have constructed the railway. Railings will be placed along the entire route of the lines at both sides, and a footbridge has been thrown—commencing at Lockhart's—over the lines to the ground where the haulage system is in operation.

Almost opposite the terminus of the electrical railway another source of anticipated pleasure to the youngsters is to be found in the tobogganing slide. Messrs. Brown and Backhouse, Chatham Works, Liverpool, are the proprietors, and the slide has been built under the supervision of their representative. The slide commences at the north end, and the cars run down a slope, gathering velocity as they proceed, along a partial level, and are brought up on an incline. Each car has a front wheel, and the smooth riding and success of the trip will depend on the manner in which this is steered by one of the passengers, though no harm can happen, we believe, to anyone. The distance covered by the tobogganer in one run is 300 feet. There are six tracks, each having its own car, and exciting contests and capital fun may be expected. Upwards of 60 tons of timber have been employed in the construction of the slide.

In a semi-circular building a panorama of the Franco-Prussian war will be shown, and to the curious the attractions of a camera-obscura are offered.

THE MODEL DWELLING.

Equally of interest to builders and others as the last exhibits described, will be the model dwelling situated at the bottom end of the Exhibition, near Park Terrace. It has been built from plans designed by Mr. Leeson, of the firm of Messrs. Oliver and Leeson, architects, Newcastle; and to Dr. Armstrong, Medical Officer of Health; and to Mr. W. T. Clarke, Chief Sanitary Inspector of Newcastle, may be awarded the credit of having promoted it. The foundation stone was laid by Mr. Clarke on 16th February last. The house is in villa form. There is a dining-room and a kitchen, a drawing-room and a study on the ground floor, and at the rear a scullery, pantry, laundry, and lavatory complete. On the first floor there are five bed-rooms, one servant's bed-room, bath-room, and lavatory. The house is suitably furnished, and at the back there is a wash-house of improved type, a coal house, woodhouse, and other accommodation. The front elevation is that of a handsome villa, with two bay windows, neat doorway with elegant porch, and three Gothic windows on the first floor. It stands on 334 square yards of land, and about 140 feet is

used as a front garden. Nearly the whole of the materials have been furnished gratuitously by tradesmen belonging to Newcastle. Seen from any point externally, the villa has a handsome look, while internally it is provided with all the fittings devised for perfect sanitary arrangement. The dwelling, indeed, is intended to demonstrate how houses can be constructed neatly, comfortably, and economically on sound sanitary principles.

THE INNER GARDEN.

is one of the pleasantest places connected with the building, and can be reached from any part of the Exhibition. It has been handsomely planted by Messrs. Little and Ballantyne, Carlisle; Watson, Newcastle; Fell, of Hexham; and Smith, Worcester. There is a band stand, which will be occupied by a military band under Mr. J. H. Amers, and in the grounds and under the neighbouring verandah delightful promenades are provided.

AWARDS TO EXHIBITORS.

We are informed that for the best exhibits in various classes diplomas by competent judges will be awarded, and these will carry with them the obtaining of medals.

THE PAVILIONS.

To the majority of visitors, the appearance of the pavilions in the North Gardens will be both a matter of enjoyment and surprise. No one could have expected that the structures which are to do duty as refreshment rooms and sale places would have been nearly so elaborately furnished as they are. As a matter of fact, however, some thousands of pounds have been spent over these productions, and the effect is in every way satisfactory. The first building which the visitor reaches on leaving the North Court is a representation of the old Carlisle Tower, which has been produced at the instance of Mr. Lyons, a London gentleman, who, after Messrs. Gibson and Co., is the largest speculator in the Exhibition. The model of the familiar building that used to grace New Bridge Street will be utilised for the sale of English and Colonial fruits and flowers. The Indo-Chinese pavilion, which also belongs to Mr. Lyons, was designed by Mr. J. S. Fairfax, of London, and has been constructed under the superintendence of Mr. Charles Brooks. Light and elegant, it will be recognised as one of the handsomest buildings on the ground. Externally it is decorated in the Indian style, and the combined appearance of domes and minarets, with a profusion of bright colours, produces a very fine effect. Downstairs there is an Indian court, and upstairs a Chinese court, in both of which light refreshments will be sold. The building is almost 90 feet long by 40 feet wide, and is estimated to seat about 1,200 persons. All the provisions sold here will be supplied exclusively by Newcastle tradesmen. The refreshment bars, the property of Messrs. Gibson and Co., include two buildings, the large pavilion standing near the entrance to the ground, and the canteen situate at the north-west end. The former is 100 feet in length, and is capable of accommodating a large number of visitors; in the latter, where refreshments will be sold at a cheap rate,

there is also accommodation for a large number of persons. The pavilion of Messrs. Lockhart is an extensive and handsome one. It is a striking square building, 108 feet in length by about 56 in width, and in addition to a large room downstairs, there is an equally commodious apartment upstairs with a fine broad balcony from which visitors will have a view of the animated exterior. The firm expect to seat 1,500 persons at a time, and, judging by the size of the place, they should have little difficulty in doing so. The model of Alnwick Castle faces the visitor as he moves up the central part of the ground. Designed by Mr. Fairfax, and erected for Mr. Lyons, it is a charming structure, and to local marksmen it will prove doubtless a centre of attraction. There is an ambush at the back, with moving foxes and hounds, and a new target of an extremely novel kind is introduced. Rifles of an improved kind are supplied by Messrs. Bland and Sons, London. A Swiss chateau, which Messrs. Meng Bros. have had constructed, is certainly one of the neatest and handsomest places in the gardens. It is a beautiful model, and will seat about 1,000 persons. Cigars and cigarettes will be manufactured at the Indian kiosk close by, while Swiss carvings will be sold by Mr. E. Cermouchi, of Edinburgh, at the handsome Victoria chalet. Messrs. Telfer and Sons have a fine building for the sale of tobacco and cigars. Mr. Armstrong's Japanese pavilion will contain flowers, fruits, and cream for the enjoyment of the masses. Messrs. C. J. Van Houten and Zoon will sell in an elaborately constructed building their far famed cocoa, and the Juvenile Shipperies, St. Jude's Bazaar, a Swiss warehouse, and other places of a like nature, will be found at this part. In the centre of the ground there is a handsome band-stand, in which music will at intervals be played.

ERRATUM.—Page 29, line 22, for "Dizduic" read "Dizé."

